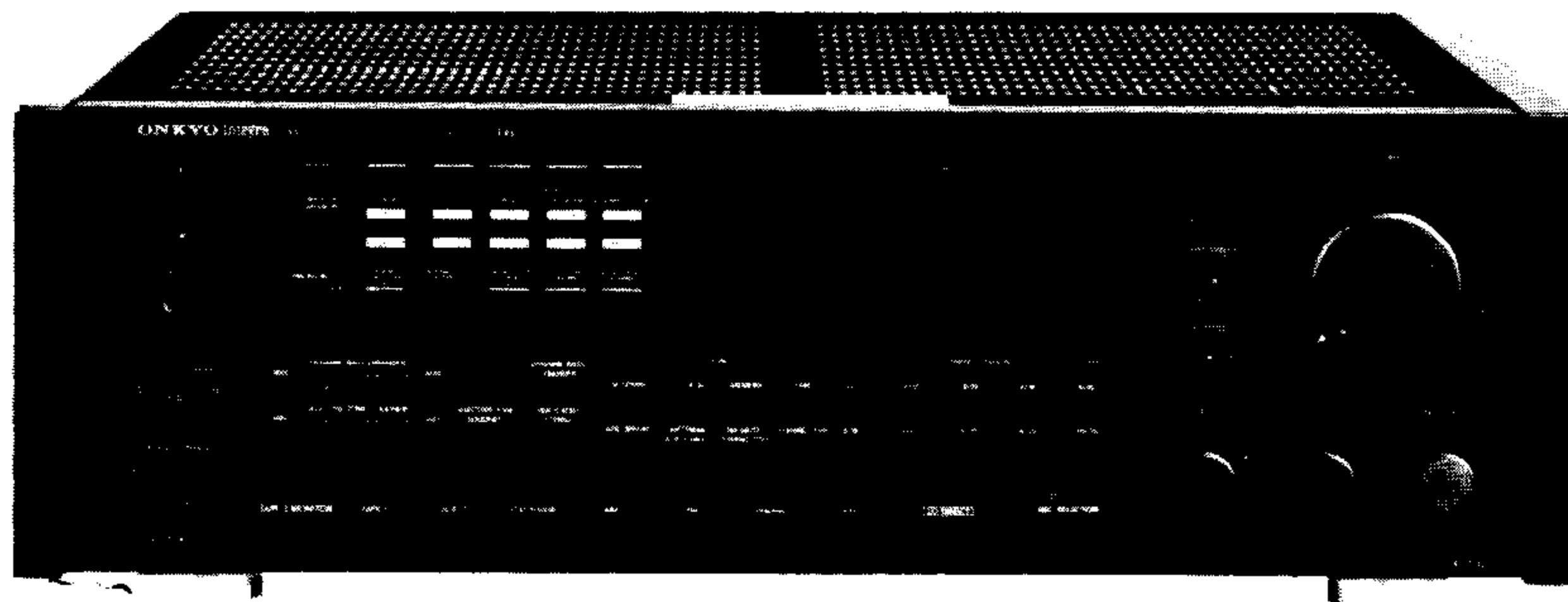


ONKYO SERVICE MANUAL**QUARTZ SYNTHESIZED
TUNER AMPLIFIER
MODELS TX-890/TX-890M****Black model**

BHUD, BHUDN, MBHUDN	120V AC, 60Hz
MBHUWX	120/220V AC, 50/60Hz

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ ON THE SCHEMATIC DIAGRAM AND IN THE PARTS LIST ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE THESE COMPONENTS WITH ONKYO PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL.

MAKE LEAKAGE-CURRENT OR RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

**ONKYO
AUDIO COMPONENTS**

SPECIFICATIONS

AMPLIFIER SECTION

Power Output:	125 watts per channel, min. RMS, at 8 ohms, both channels driven, from 20Hz to 20kHz, with no more than 0.02% total harmonic distortion.
Total Harmonic Distortion:	0.02% at rated power
IM Distortion:	0.02% at rated power
Damping Factor:	80 at 8 ohms
Frequency Response:	20-30,000Hz ± 1dB
RIAA Deviation:	20-20,000Hz ± 0.5dB
Sensitivity and Impedance:	Phono (MM): 2.5mV/50 kohms Phono (MC): 350 μ V/330 ohms CD/Tape Play: 150mV/50 kohms Tape Rec: 150mV/3.5 kohms Main In: 1V/47 kohms
Phono Overload:	150mV RMS at 1kHz, 0.02% THD
Signal-to-Noise Ratio:	Phono (MM): 93dB (at 10mV input, A weighted) 76dB (IHF A-202) Phono (MC): 88dB (at 5mV input, A weighted) 67dB (IHF A-202) CD/Tape: 98dB (A weighted) 80dB (IHF A-202)
Tone Controls:	Bass: ±10dB at 100Hz Treble: ±10dB at 10kHz
Muting:	-20dB

TUNER SECTION

FM:

Tuning Range:	87.5-108.0MHz (50kHz steps or 25kHz steps)
Usable Sensitivity:	Mono: 10.8dBf, 0.9 μ V Stereo: 17.2dBf, 2.0 μ V (75ohms)
50dB Quieting Sensitivity:	Mono: 17.2dBf, 2.0 μ V Stereo: 37.2dBf, 20 μ V (75ohms)
Capture Ratio:	1.3dB
Image Rejection Ratio:	45dB
IF Rejection Ratio:	90dB
Signal-to-Noise Ratio:	Mono: 76dB Stereo: 70dB
Alternate Channel Attenuation:	65dB
AM Suppression Ratio:	50dB
Harmonic Distortion:	Mono: 0.1% Stereo: 0.18%
Frequency Response:	30-15,000Hz ± 1.5dB
Stereo Separation:	45dB at 1kHz/30dB at 100-10,000Hz
Tuning Level:	27/17dBf

AM:

Tuning Range:	530-1620kHz (10kHz steps) and/or 522-1611kHz (9kHz steps) (Worldwide model)
Usable Sensitivity:	30 μ V
Image Rejection Ratio:	40dB
IF Rejection Ratio:	40dB
Signal-to-Noise Ratio:	40dB
Harmonic Distortion:	0.7%

GENERAL

Power Supply:	AC120V, 60Hz
USA & Canadian models:	
Worldwide models:	120 and 220V switchable, 50/60Hz
Dimensions (W × H × D):	465×158×432mm 18-5/16"×6-3/16"×17"
Weight:	14.8kg., 32.6lbs

REMOTE CONTROL TRANSMITTER RC-118S

Transmitter: Infrared
 Signal range: Approx. 5meters(16ft.4")
 Power supply: TWO "AA" batteries (1.5V×2)
 Dimensions(W×H×D): 64×18×176mm
 2-1/2 " ×3/4 " × 7"
 Weight: 140grams 5.0oz.(including batteries)

Specifications and features are subject to change without notice.

SERVICE PROCEDURES

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

D (120V) model

Circuit no.	Part no.	Description
F901	252052	7A (ST-6), Primary
W (Worldwide) model		
Circuit no.	Part no.	Description
F901	252052	7A (ST-6), Primary
F902	252077	4A-SE-EAK, Primary

2. Change of AM band step.

With the exception of the models below, a BAND STEP selector switch is not provided.

BAND STEP	D763, JL009
10kHz→ 9kHz	Additional
9kHz→10kHz	Eliminated

In D763 1SS133 (Part No. 223163) is used. Between #1 and #2 of JL009 a jumper lead must be inserted.
 (Refer to page 23)

— Worldwide model —

Worldwide models are equipped with a step band selector switch. This switch is located on the back panel. This switch is set to 10kHz and 9kHz at the factory, but may have to be reset to 9kHz or 10kHz depending on the area where the unit is used.

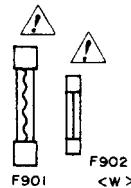
	De-emphasis	AM step
Europe:	50μsec	9kHz
U.S.A.:	75μsec	10kHz

Change of voltage

Worldwide models are equipped with a voltage selector to conform with local power supplies. This switch is located on the back panel. Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

This switch is set to 220V at the factory. Voltage is changed by sliding the groove in the switch with the screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

NAPS-346I-1



POWER SUPPLY CIRCUIT PC BOARD

4. Safety-check out

(Only U.S.A. model)

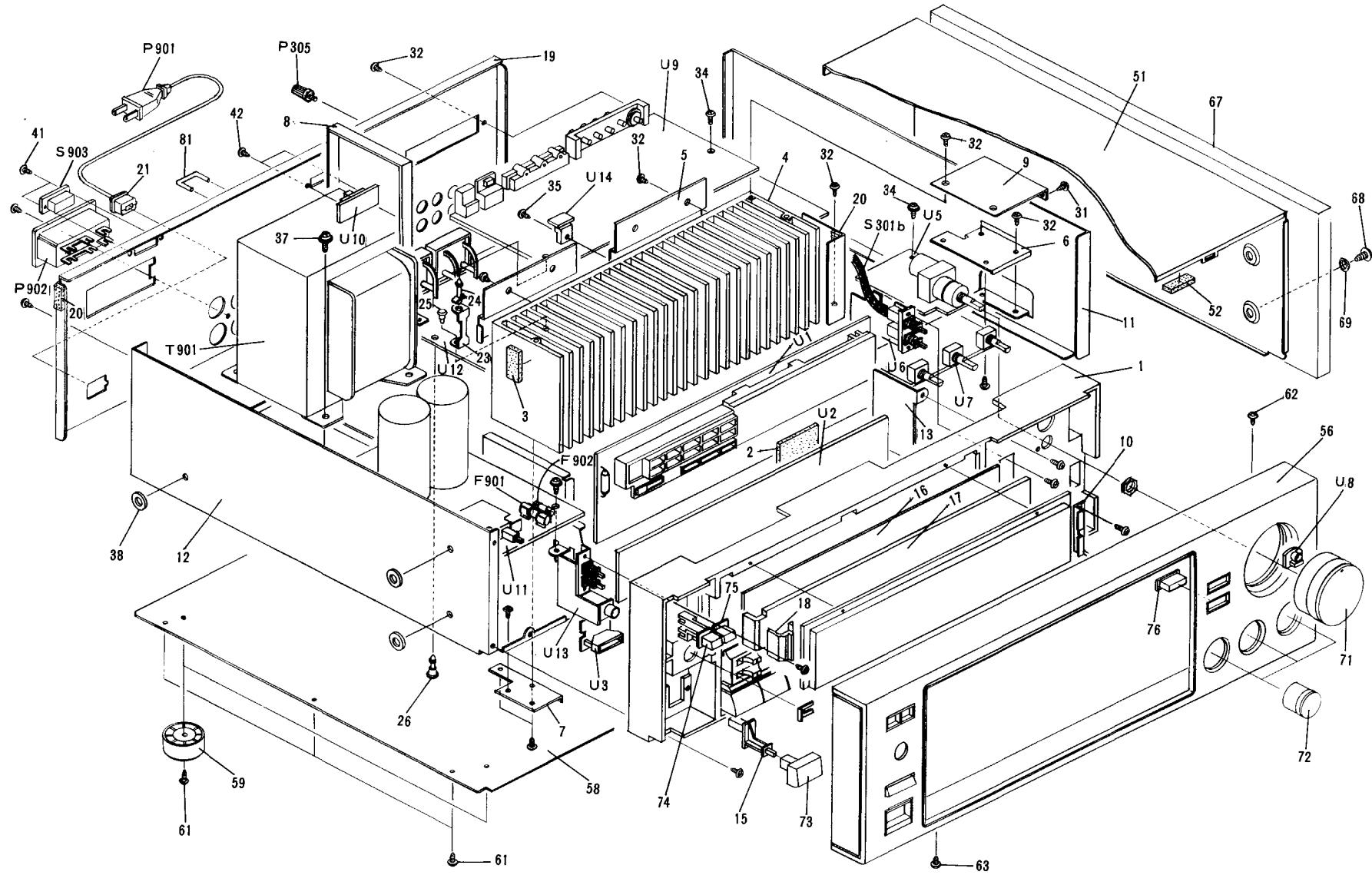
After correcting the original service problem perform the following safety check before releasing the set to the customer.

Connect the insulating-resistance tester between the plug of power supply cord and terminal GND on the back panel. Specifications: 3.3 Mohm ±10% at 500V.

5. Memory preservation

This unit does not require memory preservation batteries. A built-in memory power back-up system preserves contents of the memory during power failures and even when the unit is unplugged. The unit must be plugged in and the power switch turned on and off once in order to charge the back-up system. Note that since this is not a permanent memory the power switch must be turned on and off a few times each month to keep the back-up system operative. The period of time during which memory contents are preserved after power has last been turned off varies depending on climate and placement of the unit. On the average, memory contents are protected over a period of 3 to 4 weeks (a minimum of 2 weeks) after the last time power has been turned off. This period is shorter when the unit is exposed to very high humidity or used in an area with an extremely humid climate.

EXPLODED VIEW



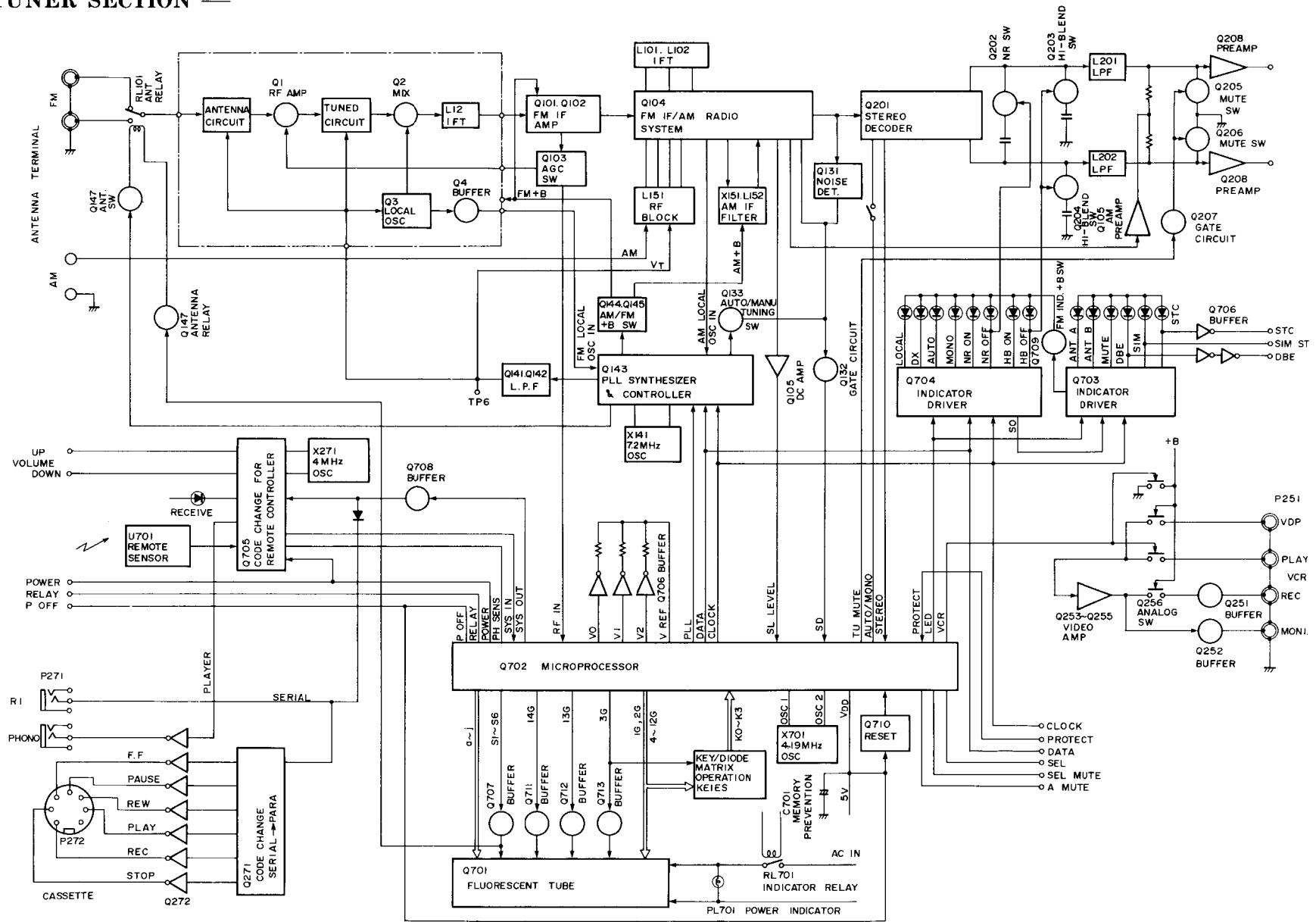
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1	27110455B	Front bracket ass'y	57	28191491A	Clear plate	U2	1A124553-1A	NASW-3453-1A, Operation switch
2	28140923	t3×60×45, Cushion	58	27170254B	Bottom board			pc board ass'y <W>
3	28140927	t2×30×10, Cushion	59	27175153	Leg	U3	1A123554-1	NASW-3454-1, Stand-by switch
4	27160235	Radiator	61	834430088	3TTS+8B(BC), Tapping screw			pc board ass'y
5	27130435	Bracket, transistor	62	833430080	3TTP+8P(BC), Tapping screw	U4	1A124555-1	NASW-3455-1, AM band step
6	27141301	Bracket, HR	63	834430108	3TTS+10B(BC), Tapping screw			selector pc board ass'y <W>
7	27141302	Bracket HL	66	28185340	Side panel L	U5	1A123556-1	NAAF-3456-1, Volume pc
8	27141321	Bracket, power transformer	67	28185342	Side panel R			board ass'y
9	27141322	Bracket R	68	836440303	4STV+30CQ(BC), Tapping screw	U6	1A123557-1	NASW-3457-1, Mode switch pc
10	27141300	Bracket S	69	870086	W4×12(BC), Special washer			board ass'y
11	27115240A	Side bracket R	71	28323558	Knob VOLUME	U7	1A123558-1	TX-9023 NAAF-3458-1, Tone control circuit
12	27130564A	Bracket, power transformer	72	28323559	Knob TONE	U8	1A123559-1	pc board ass'y
13	27130565A	Bracket F	73	28323241A	Knob POWER			NADIS-3459-1, Volume indicator
14	27141306	Bracket K	74	28323314	Knob SPEAKER A			pc board ass'y
15	27273111	Joint, power	75	28323316	Knob SPEAKER B	U9	1A123560-1	NARF-3460-1, FM/AM tuner pc
16	28133211	Back plate	76	28323560	Knob PUSH			board ass'y <D>
17	28130251	Dial plate	81	27141033	Connection plug (pre out- main in)		1A124560-1A	NARF-3460-1A, FM/AM tuner pc
18	27190686	Holder, dial plate						board ass'y <W>
19	27121193	Back panel <D>	F901	252052	△ 7A(ST-6), Primary fuse	U10	1A123567-1	NASW-3467-1, De-emphasis switch
20	27121194	Back panel <W>	F902	252077	△ 4A-SE-EAK, Primary fuse <W>			pc board ass'y <W>
21	28140020	t2×10×40, Cushion	P305	25060044	Terminal GND	U11	1A123561-1	NAPS-3461-1, Power supply circuit
22	27300750	△ Strainrelief	P901	243123, 253136, 253140 or 253146	△ AS-CU-6 #18, Power supply cord		1A124561-1A	pc board ass'y <D>
23	27141200A	Bracket, pc board						NAPS-3461-1A, Power supply circuit
24	27190062	KGLS-12S, Holder						pc board ass'y <W>
25	880009	Rivert				U12	1A123562-1	NAAF-3462-1, Pre. and power
26	27190693	KGLS-6R, Holder	P902	25050293	△ NSCT-6P120, AC outlet			amplifier pc board ass'y
27	838430068	3TTB+6B(BC), Tapping screw	Q525, Q526	2201653, 2201654 or	2SC3856-O, 2SC3856-Y or	U13	1A123563-1	NASW-3463-1, Speaker switch
28	834430088	3TTS+8B(BC), Tapping screw	Q529, Q530	2201655	2SC3856-P, Power transistor			pc board ass'y
29	833430080	3TTP+8P(BC), Tapping screw		Q527, Q528	2201663, 2SA1492-O	U14	1A123564-1	NAETC-3464-1, Power supply
30	831130088	3TTW+8B, Tapping screw		Q531, Q532	2201664 or 2201665			transistor pc board ass'y
31	834430108	3TTS+10B(BC), Tapping screw			2SA1492-Y or 2SA1492-P, Power transistor	U15	1A123565-1	NAETC-3465-1, Power supply
32	834230108	3TTS+10B(Ni), Tapping screw						transistor pc board ass'y
33	830440089	4TTC+8C(BC), Tapping screw	S301b	25065112	Wire for remote switch			
34	27270212	Spacer	S903	26065123	△ NSS-1258P, Voltage selector switch <W>	NOTE: <D>: Only 120V model <W>: Only Worldwide model		
35	82143006	3P+6FN(BC), Pan head screw						
36	833426060	2.6TTP+6P(BC), Tapping screw for U2	T901	2300379	△ NPT-1016D, Power trans- former <D>			
37	82143006	3P+6FN(BC), Pan head screw (Voltage selector switch) <W>		2300380	△ NPT-1016DG, Power trans- former <W>			
38	82142604	2.6P+4F(BC), Pan head screw (Band/De-emphasis switch) <W>	U1	1A123552-1	NADIS-3452-1, Display circuit			
39	28184419A	Top cover	U2	1A123553-1	pc board ass'y			
40	28140020	t4×10×40, Cushion			NASW-3453-1, Operation switch			
41	1A123121	Front panel ass'y			pc board ass'y <D>			

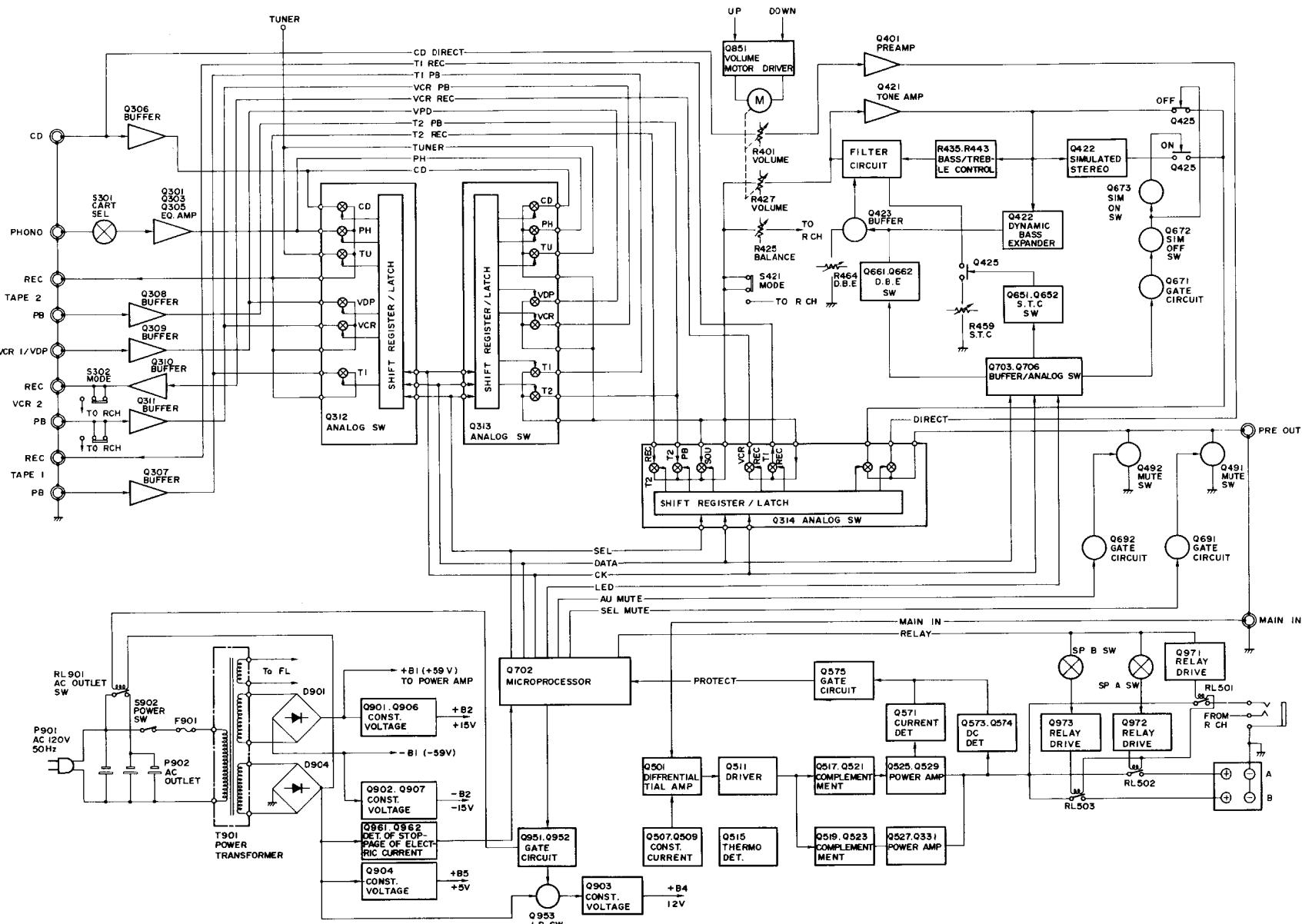
NOTE: THE COMPONENTS IDENTIFIED BY MARK △
ARE CRITICAL FOR RISK OF FIRE AND
ELECTRIC SHOCK. REPLACE ONLY WITH
PART NUMBERS SPECIFIED.

BLOCK DIAGRAM

— TUNER SECTION —

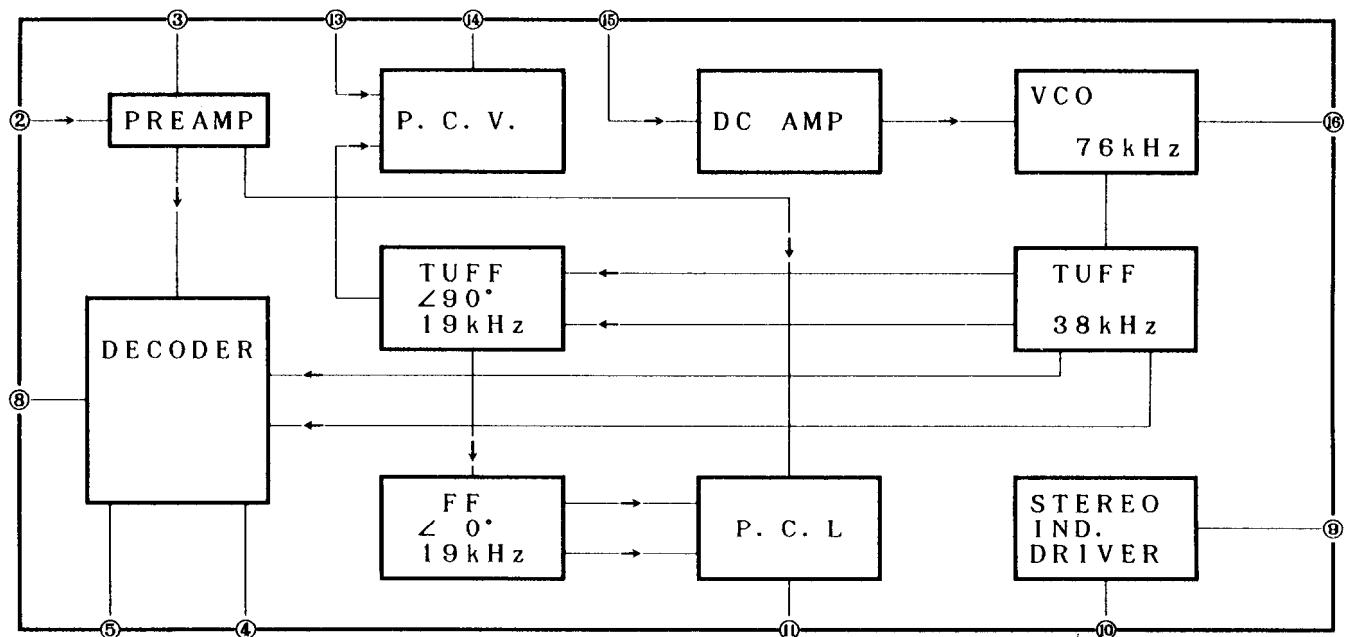


— AMPLIFIER SECTION —

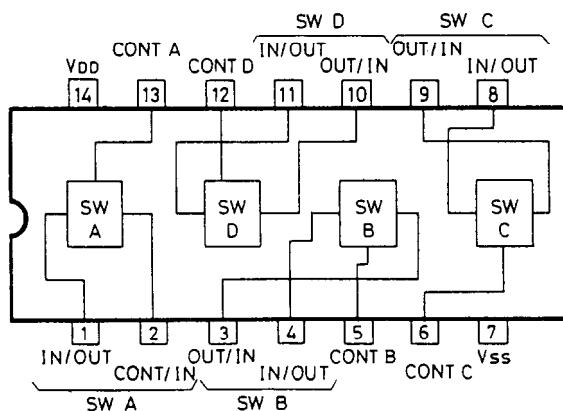


IC BLOCK DIAGRAM AND DESCRIPTIONS

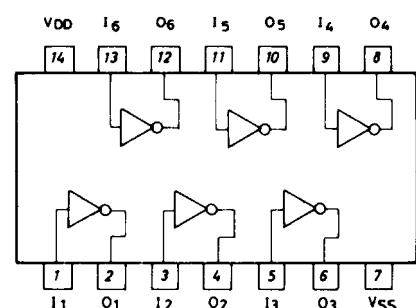
HA12016 (FM STEREO DECODER)



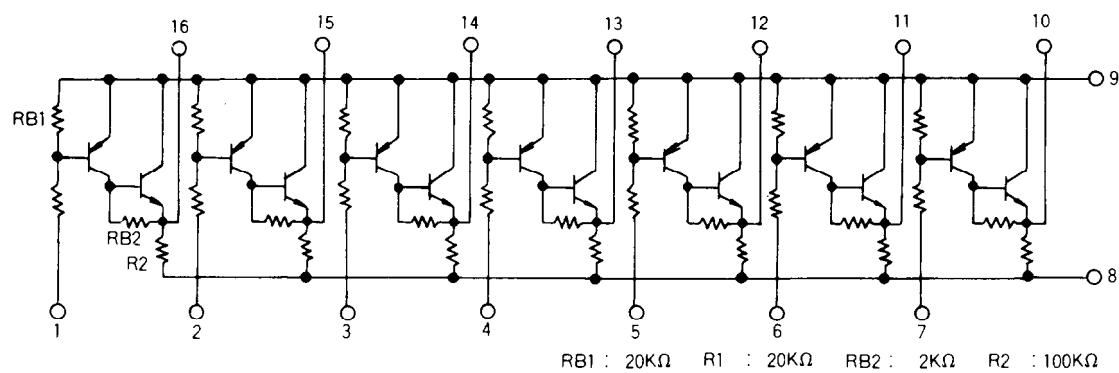
LC4966 (ANALOG SWITCH)



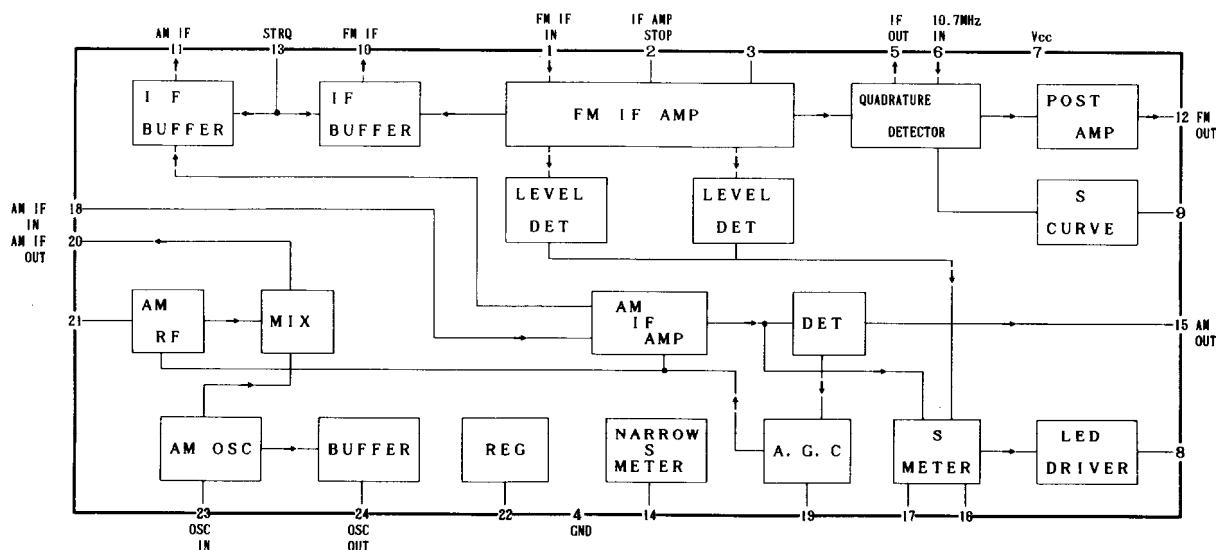
4069UB (HEX INVERTER)



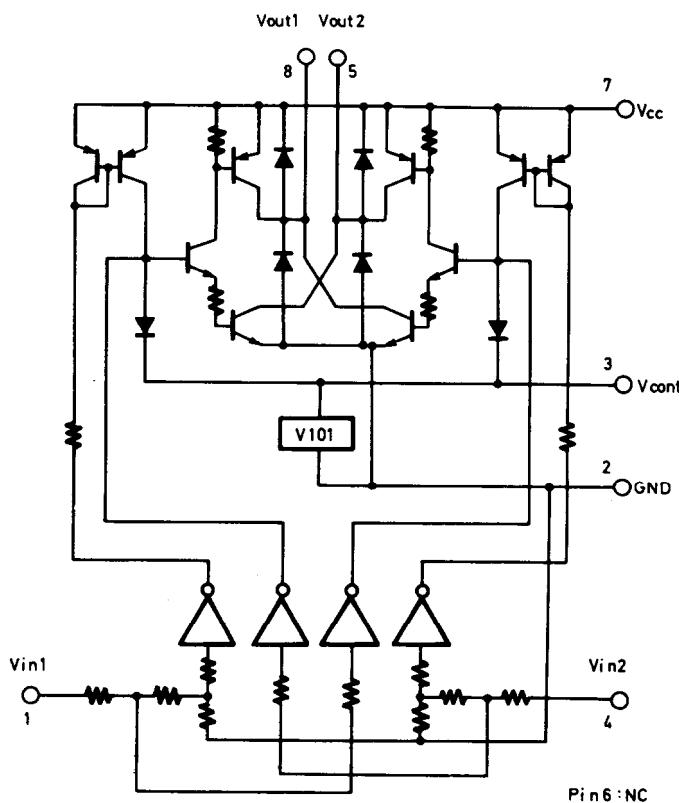
μPA81C (INVERTER/BUFFER)



LA1266A (FM IF AND AM RADIO SYSTEM)

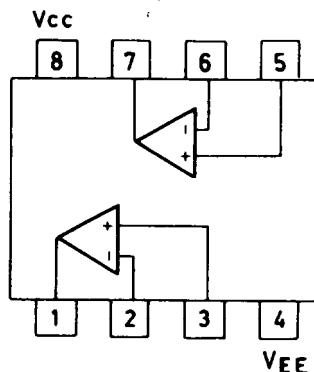


LB1630 (MOTOR DRIVER)

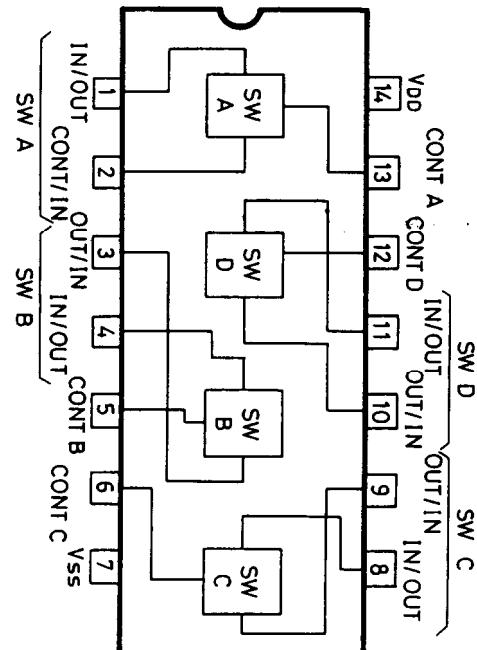


TRUTH TABLE

IN 1	IN 2	OUT 1	OUT 2	MOTOR
H	L	H	L	Normal
L	H	L	H	Reverse
H	H	OFF	OFF	Wait
L	L	OFF	OFF	Wait

NJM4565DD/NJM4558DX/
μPC4570C (OP. AMP)

4066B (ANALOG SWITCH)



LC6538D-3838 (MICROPROCESSOR)

Pin No.	Symbol	Description
1	D14	These are the digit and key scan signal output terminals. "H" when active.
2	D13	Refer to the key and diode matrix.
3	D12	
4	D11	
5	D10	
6	D9	
7	D8	
8	D7	
9	D6	
10	D5	
11	D4	
12	D3	
13	D2	
14	D1	
15	VDD	Power supply terminal. (+5V)
16	OSC1	Connect to the 4.19MHz ceramic oscillator.
17	OSC2	
18	VSS	Ground terminal.
19	TEST	Test terminal. Connect to the ground.
20	RES	This is the input terminal for reset when the power switch turns on. "L" when active.
21	X1	Sub clock terminal. Not used. Terminal X1 Connects to the ground.
22	X2	
23	POWER	This is the output terminal for power source. It is "H" for power on. This signal controls to the power supply circuit and the relay for AC outlet.
24	RELAY	This is the output terminal for control of the speaker and headphone relaies. "H" when active.
25	VDP	These are the output terminals for control of video signal.
26	VCR	
27	PHONO	This is the output terminal for control of record player. "L" when the source selector is PHONO
28	MUTING	This is the output terminal for muting control. "H" when active.
29	SEL MUTE	This is the muting output terminal when the selector key is operated. "H" when active.
30	TUNER MUTE	This is the output terminal for muting control of tuner section. "H" when active.
31	K0	These are the input terminals for key return signal source and diode matrix.
32	K1	"H" when active.
33	K2	
34	K3	
35	S IN	This is the signal strength input terminal.
36	SD	Auto stop signal input terminal. Auto tuning stops when this terminal becomes to the high level
37	STEREO	This is the input terminal for detection of the stereo broadcast. "L" when active.
38	RF IN	This is the input terminal for RF level.
39	LED	This is the output terminal for indicator LED driver. Connect to terminal LAT of μ PD6345C.
40	VREF	This is the input terminal for comparator reference voltage.
41	AUTO/MONO	This is the AUTO/MONO switching output terminal. "L" when AUTO.
42	PLL	Connect to the terminal CE of PLL IC (LM7001).
43	DATA	This is the serial data output terminal. Connect to the terminal DATA of PLL IC, and terminal DI of LED driver (μ PD6345C), and terminal DI of analog switches (LC7821/LC7822).
44	CL	This is the serial clock output terminal. Connect to the terminal CI of PLL IC, and terminal SCK of LED driver, and terminal CL of analog switches.
45	SEL	Connect to the terminal SEL of analog switches.
46	<u>VO</u>	These are the output terminals for comparator reference voltage. Refer to the signal level
47	<u>V1</u>	indicator circuit.
48	<u>V2</u>	
49	P OFF	This is the input terminal for detection of the stoppage of electric current. "L" when the stoppage of electric current.
50	PROTECT	This is the detection terminal for protection circuit. The speaker and headphone relaies turn off when this terminal become to the high level.
51	SYSTEM OUT	This is the output terminal for system code. "L" when active.
52	SYSTEM IN	This is the input terminal for system code. "H" when active.

Pin No.	Symbol	Description
53	DISPLAY	This is the display output terminal. This signal controls to the static indication section of fluorescent tube. "L" when active.
54	Sa	
55	Sb	
56	Sc	
57	Sd	These are the segment signal output terminals. "H" when active.
58	Se	
59	Sf	
60	Sg	
61	Sh	
62	VP	Pull-down resistor connection terminal of FIP controller/driver.
63	Si	These are the segment signal output terminals.
64	Sj	"H" when active.

KEY AND DIODE MATRIX

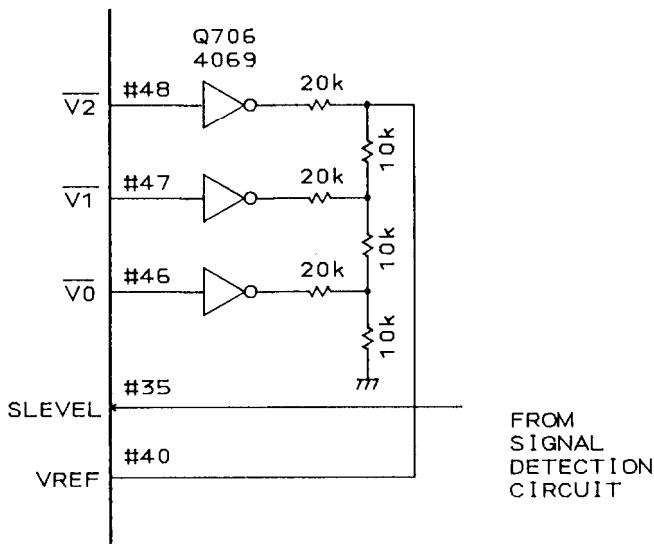
	K3 (#34)	K2 (#33)	K1 (#32)	K0 (#31)
D1 (#14)	M4	M3	M2	M1
D2 (#13)	M8	M7	M6	M5
D3 (#12)	MEMORY	SHIFT	M10	M9
D4 (#11)	TU LEVEL	FM MUTE	UP	DOWN
D5 (#10)	CD DIRECT	POWER	APR	ANT
D6 (#9)	AM	FM	PHONO	CD
D7 (#8)	TAPE 2	TAPE 1	VCR	VDP
D8 (#7)	SIM STEREO	STC	DBE	REC SEL
D9 (#6)				AUTO/MONO
D10 (#5)	SYS DIS(1)	TI DIS(0)	AM9K (0/1)	MODE

ALTERNATE KEY
DIODE MATRIX

AM9K (AM band step setting diode matrix)

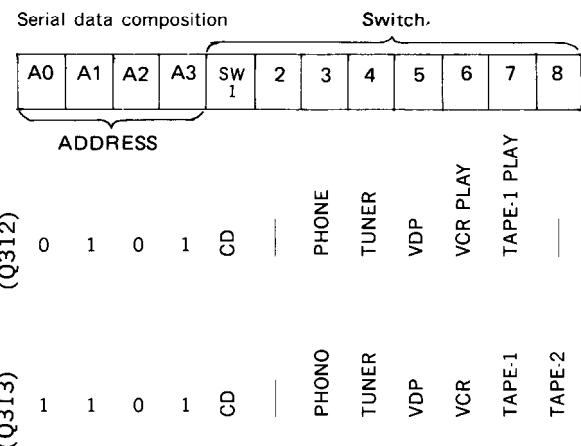
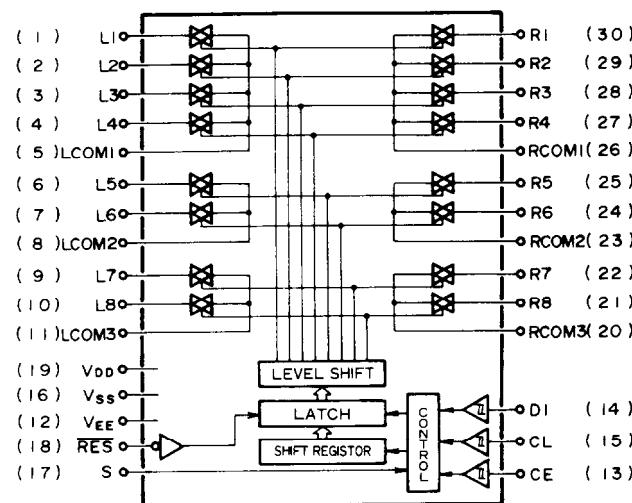
D763	Frequency range	Channel space	Reference frequency	IF frequency
0	530~1620kHz	10kHz	10kHz	450kHz
1	522~1611kHz	9kHz	9kHz	450kHz

SIGNAL LEVEL INDICATOR CIRCUIT



Output terminals			Signal strength indicator
V2	V1	V0	
H	H	H	Light off
H	H	L	Light off
H	L	H	1st on
H	L	L	2nd on
L	H	H	3rd on
L	H	L	4th on
L	L	H	5th on
L	L	L	5th on

LC7821 (Analog switch)



(Q312)

Pin No.	Terminal	Description
1	CD	
2	—	
3	PHONO	
4	TUNER	
5	L COM 1	
6	VDP	
7	VCR PLAY	
8	L COM 2	
9	TAPE 1 PLAY	
10	—	
11	L COM 3	
12	V _{EE}	Negative power supply terminal. (-15V)
13	CE	Chip enable terminal. Connect to SEL terminal of LC6538D-3838.
14	DI	Serial data input terminal. Connect to DATA terminal of LC6538D-3838.
15	CL	Serial clock input terminal. Connect to CLOCK terminal of LC6538D-3838.

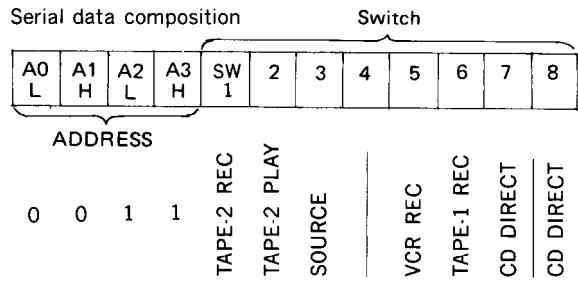
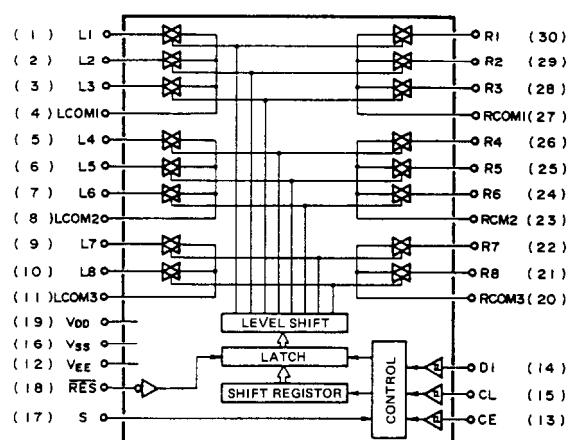
Pin No.	Terminal	Description
16	V _{ss}	Ground terminal.
17	S	Selector terminal.
18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
19	VDD	Power supply terminal. (+15V)
20	R COM 3	
21	—	
22	TAPE 1 PLAY	
23	R COM 2	
24	VCR PLAY	
25	VDP	
26	R COM 1	
27	TUNER	
28	PHONO	
29	—	
30	CD	

(Q313)

Pin No.	Terminal	Description
1	CD	
2	—	
3	PHONO	
4	TUNER	
5	L COM 1	
6	VDP	
7	VCR	
8	L COM 2	
9	TAPE 1	
10	TAPE 2	
11	L COM 3	
12	V _{EE}	Negative power supply terminal. (-15V)
13	CE	Chip enable terminal. Connect to SEL terminal of LC6538D-3838.
14	DI	Serial data input terminal. Connect to DATA terminal of LC6538-3838.
15	CL	Serial clock input terminal. Connect to CLOCK terminal of LC6538-3838.

Pin No.	Terminal	Description
16	V _{ss}	Ground terminal.
17	S	Selector terminal.
18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
19	VDD	Power supply terminal. (+15V)
20	R COM 3	
21	TAPE-2	
22	TAPE-1	
23	R COM 2	
24	VCR	
25	VDP	
26	R COM 1	
27	TUNER	
28	PHONO	
29	—	
30	CD	

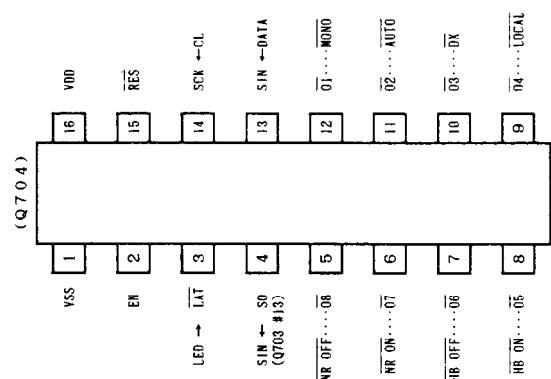
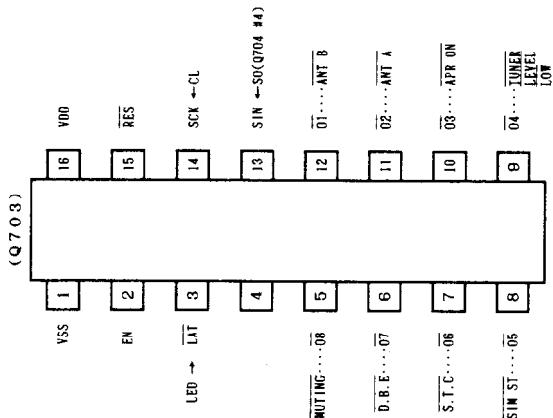
LC7822 (ANALOG SWITCH)

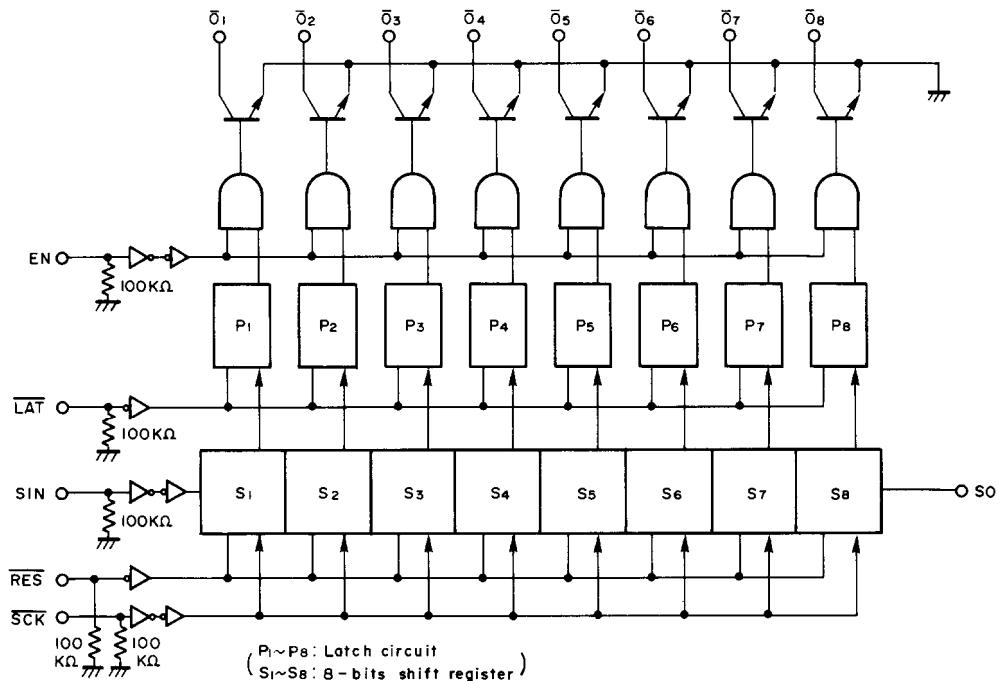


(Q314)

Pin No.	Terminal	Description	Pin No.	Terminal	Description
1	TAPE 2 REC		16	V _{SS}	Ground terminal.
2	TAPE 2 PB		17	S	Selector terminal.
3	SOURCE		18	RES	Reset terminal. When power is turned ON, the condition of the analog switch is not determined, but when this terminal is "L", all analog switches are OFF.
4	L COM 1		19	V _{DD}	Power supply terminal. (+5V)
5	VCR REC		20	R COM 3	
6	TAPE 1 REC		21	CD DIRECT	
7	L COM 2		22	CD DIRECT	
8	CD DIRECT		23	R COM 2	
9	CD DIRECT		24	TAPE 1 REC	
10	L COM 3		25	VCR REC	
11			26	R COM 1	
12	V _{EE}	Negative power supply terminal. (-15V)	27	SOURCE	
13	CE	Chip enable terminal. Connect to SEL terminal of LC6538D-3838.	28	TAPE 2 PB	
14	D _I	Serial data input terminal. Connect to DATA terminal of LC6538D-3838.	29	TAPE 2 REC	
15	CL	Serial clock input terminal. Connect to CLOCK terminal of LC6538D-3838.	30		

μ PD6345C (INDICATOR LED DRIVER)





(Q704)

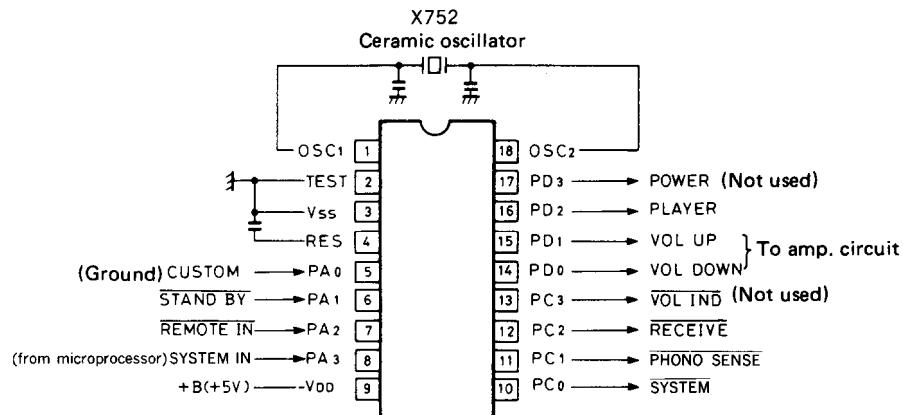
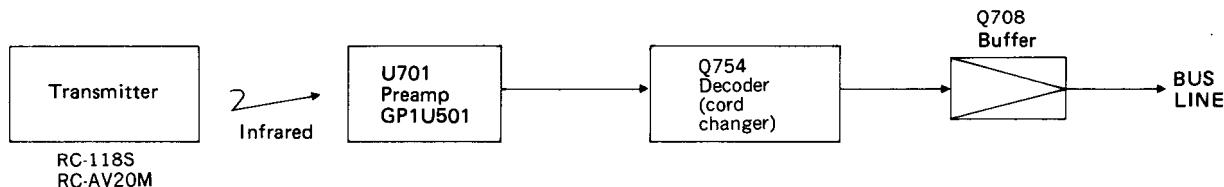
Pin No.	Symbol	Descriptions	Pin No.	Symbol	Descriptions
1	VSS	Ground terminal.	1	VSS	Ground terminal.
2	EN	Enable terminal. Connect to 5V.	2	EN	Enable terminal. Connect to 5V.
3	LAT	Latch terminal. Connect to the terminal LED of LC6538D-3838.	3	LAT	Latch terminal. Connect to the terminal LED of LC6538D-3838.
4	S0	Serial data output terminal. Connect to terminal SIN of μ PD6345C(Q703)	4	S0	Serial data output terminal.
5~12	$\overline{08} \sim \overline{01}$	Data output terminals. Connect to the indicator L. E. Ds.	5~12	$\overline{08} \sim \overline{01}$	Data output terminals. Connect to the indicator L. E. Ds.
13	SIN	Serial data input terminal. Connect to the terminal DATA of LC6538D-3838.	13	SIN	Serial data input terminal. Connect to the terminal S0 of μ PD6345C(Q704).
14	SCK	Serial clock input terminal. Connect to the terminal CL of LC6538D-3838.	14	SCK	Serial clock input terminal. Connect to the terminal CL of LC6538D-3838.
15	RES	Reset input terminal. "L" when active.	15	RES	Reset input terminal. "L" when active.
16	VDD	Power supply terminal. (+5V)	16	VDD	Power supply terminal. (+5V)

(Q703)

Recording Selector Button and Display.

This button selects the source of audio signal output to REC OUTPUT of TAPE-1 and VCR-2. Each time it is pressed, the selection changes in the sequence of **SOURCE**, **CD**, **PHONO**, **TUNER**, **VCR-1/VDP**, **VCR-2**, **TAPE-1**, **TAPE-2** → **SOURCE**, and the selected position is displayed within the red frame. Set this button to **SOURCE** when REC OUT audio signals will not be used.

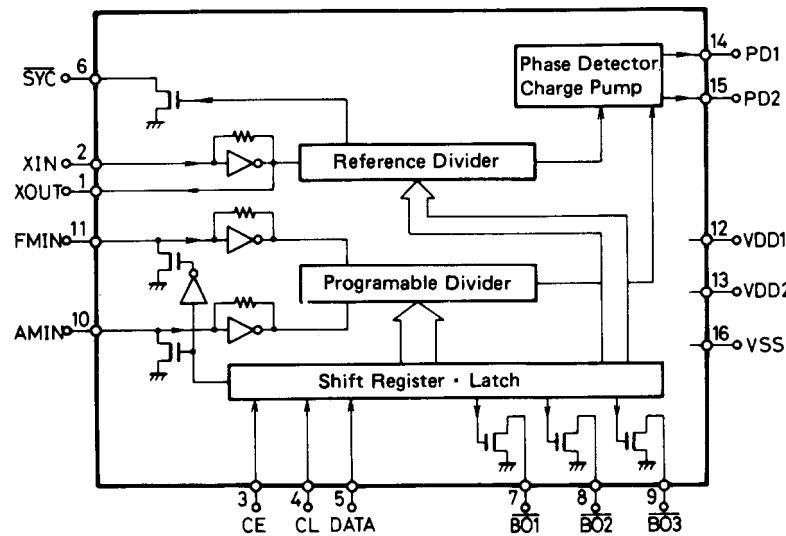
LC6527C-3802 (CODE CHANGER)



Connection diagram

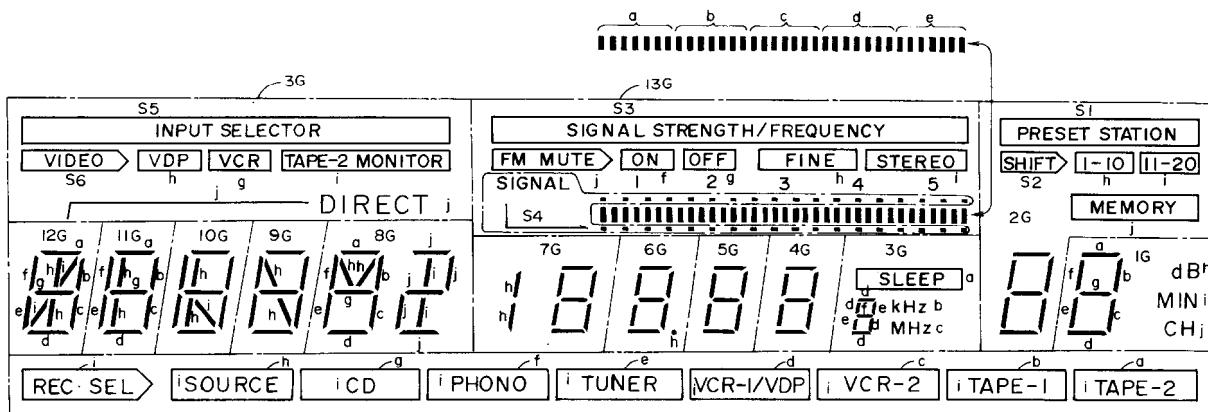
Terminal No.	Symbol	Terminal	Description
1 18	OSC1 OSC2	OSC	Connect to the 4MHz ceramic oscillator.
2	TEST	TEST	Test terminal. Connect to the ground.
3	Vss	GND	Ground terminal.
4	RES	RES	Reset terminal.
5	PA0	CUSTOM	The custom code for decode is selected at this terminal. For this model, the level is low.
6	PA1	STANDBY	Terminal for STANDBY detection. During low input, only the POWER code is decoded.
7	PA2	REMOTE IN	Signal input terminal from remote control preamp. Active low.
8	PA3	SYSTEM IN	System code input terminal. Active high.
9	V _{DD}	+B(5V)	Power supply terminal.
10	PC0	SYSTEM OUT	Output at this terminal are the custom code remote control code input to REMOTE IN, the system code that has been converted corresponding to the decoded data code.
11	PC1	PH SENS	Phono detection input terminal. Active low.
12	PC2	RECEIVE	This is the display output for remote control reception. Output is low when decoded code is being received.
13	PC3	VOLIND	During output of VOLUME UP/DOWN, a pulse (J T L T L; T=250ms) is output.
14	PD0	VOL DOWN	When the volume DOWN code is input, a high pulse of 120ms is output.
15	PD1	VOL UP	When the volume UP code is input, a high pulse of 120ms is output.
16	PD2	PLAYER	Player control output terminal.
17	PD3	POWER	The power code input inverts the L/H. Level is high for power being turned ON.

LM7001 (PLL SYNTHESIZER AND CONTROLLER)



Pin No.	Terminal	Description
1	XOUT	Connect to the 7.2 MHz crystal oscillator.
2	XIN	
3	CE	Chip enable terminal. Connect to the PLL terminal of LC6538D-3838.
4	CL	Serial clock input terminal. Connect to the CL terminal of LC6538D-3838.
5	DATA	Serial data input terminal. Connect to the DATA terminal of LC6538D-3838.
6	SYN	Not used.
7	BO1	Antenna selector output terminal. Antenna B.
8	BO2	FM auto tuning output terminal. "L" when FM. Auto tuning at low level at high level.
9	BO3	AM band control signal output terminal. AM band at low level.
10	AMIN	AM local oscillator input terminal.
11	FMIN	FM local oscillator terminal.
12	VDD 1	Power supply terminal for back-up.
13	VDD 2	Power supply terminal.
14	PD1	Charge pump output of the phase detector which constitutes the PLL. High level is output when the divided local oscillator frequency is high than the reference frequency.
15	PD2	In the opposite case, low level is output. Floating occurs when the frequencies matched. The output is applied to the variable capacitor diode in the local oscillator through the low pass filters.
16	Vss	Ground terminal.

FIP15AMW26 (FLUORESCENT INDICATOR TUBE)



Terminal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Electrode	F	NP	S1	S2	S3	S4	S5	S6	j	i	NP	h	NP	g	f	NP	e

(Left)

Terminal No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Electrode	d	c	b	a	NP	NP	NP	14G	NP	13G	12G	11G	10G	9G	8G	7G	6G

Terminal No.	35	36	37	38	39	40	41	42	43
Electrode	5G	4G	3G	2G	1G	NP	NP	NP	F

(Right)

F : Filament
 G : Grid
 NP: No pin
 a~j/1G~14G: Anode

Segment	Digit	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1
Sa	TAPE-2	1th □		a	a	a	a	a	a	a	a	a	SLEEP	a	a
Sb	TAPE-1	2nd □		b	b	b	b	b	b	b	b	b	kHz	b	b
Sc	VCR	3rd □		c	c	c	c	c	c	c	c	c	MHz	c	c
Sd	VDP	4th □		d	d	d	d	d	d	d	d	d	— —	d	d
Se	TUNER	5th □		e	e	e	e	e	e	e	e	e	— —	e	e
Sf	PHONO	ON		f	f	f	f	f	f	f	f	f	— —	f	f
Sg	CD	OFF		g	g	g	g	g	g	g	g	g	VCR	g	g
Sh	SOURCE	FINE		— —	VDP	1-10(A)	dB								
Si	REC SEL	STEREO		— —			— —		— —				TAPE-2	11-20(B)	MIN
Sj		FM MUTE						— —					DIRECT	MEMORY	CH

ADJUSTMENT PROCEDURES

Preparation

• Input

FM mono: 1kHz, 75kHz devi., 60dB/ μ V

FM stereo: 1kHz, L+R 67.5kHz devi.: Pilot signal 19kHz
7.5kHz devi.

AM: 400Hz, 30% mod.,

• Output

Connect the non-inductive type resistor of 8 ohms to the speaker terminal A of left and right channels unless otherwise noted.

• Standard knob position

TAPE MONITOR	SOURCE
VOLUME	Maximum
BASS/TREBLE/BALANCE	Center
MODE	STEREO
SPEAKER	A
SIMULATED STEREO	OFF
DYNAMIC BASS EXPANDER	OFF
SELECTIVE TONE CONTROL	OFF
MUTING/LOUDNESS	OFF
CARTRIDGE SELECTOR	MM
REC SELECTOR	SOURCE

Amplifier section

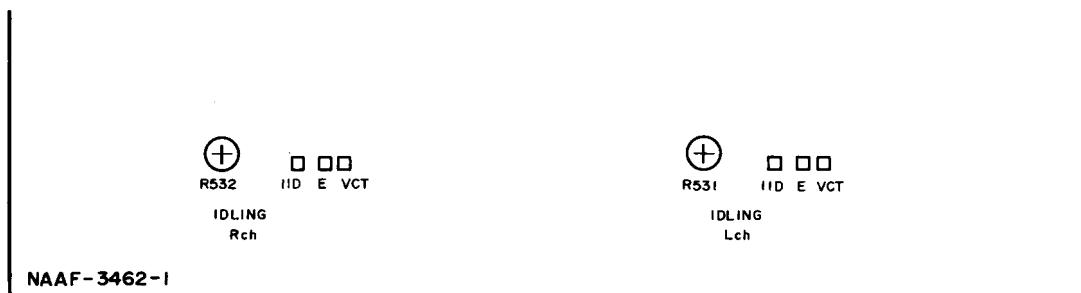
1. Idling current adjustment

Connect the DC voltmeter to the terminals IID and VCT on the power amplifier pc board.

Adjust the semi-fixed resistors R531 and R532 so that the indication of voltmeter is 15 ± 2 mV.

Notes: VOLUME Maximum, Open load,
Adjust after switching on for 15 minutes.

21 MAX



2. Check of operation of protection circuit.

1) Check of operation of protection relay.

- (1) Confirm that the relay turns ON approximately 5 seconds after the power switch is turned ON.
- (2) The relay should turn OFF approximately 0.5 seconds after the power switch is turned OFF.

2) Check of DC detection

- (1) Turn the power on with no load.

- (2) After the speaker relay turns ON, apply DC1~1.5V to the CD input terminals. Confirm that the relay turns OFF.
- (3) Confirm that operation is the same as (2) above when an input of DC-1~-1.5V is applied.

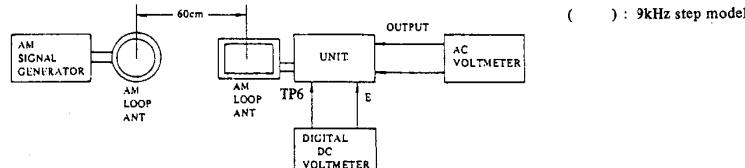
Note) Under no circumstances connect a load or short the speaker terminals when performing the above test.

FM section

Item	Step	Connection of instrument	FM SG output	Stereo modulator output	Turning dial setting	Output indicator	Adjustment	Adjust for	Remarks
FM IF	1	Fig. 1	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)	-	99.1MHz	DC millivolt meter	L101	0V ± 20mV	Muting switch: OFF Repeat the steps 1 and 3 until no further adjustment is necessary
	2					DC voltmeter	IF on the front end	Maximum	
	3					Distortion analyzer	L102	Minimum	
VCO		Fig. 2	99.1MHz 1kHz, 75kHz devi. 65dBf (60dB)	-	99.1MHz	Frequency counter	R201	76kHz ± 40Hz	
Stereo Distortion		Fig. 3	99.1MHz 65dBf (60dB) Ext. modulation	L or Rch. 1kHz	99.1MHz	Distortion analyzer	IF on the front end	Minimum	Don't turn more than ± 180°:
Stereo Separation	1	Fig. 3	99.1MHz 65dBf (60dB) Ext. modulation	Lch. 1kHz	99.1MHz	Rch. AC voltmeter	R202	Minimum	Maximum and same separation
	2			Rch. 1kHz		Lch. AC voltmeter		Minimum	
Muting level	1	Fig. 3	99.1MHz 19.2dBf (14dB) Ext. modulation	-	99.1MHz	Auto indicator	R101	Light on	Muting switch: ON
	2		99.1MHz 18.2dBf (13dB) Ext. modulation					Light off	
Signal indicator level		Fig. 3	99.1MHz 45.2dBf (40dB) 1kHz, 75kHz devi.	-	99.1MHz	5th Signal indicator	R102	Light on	

AM section

Step	AM SG output	Tuned frequency	Output indicator	Adjustment point	Adjust for
1		530kHz (531kHz)	Digital DC voltmeter	OSC on RF block	1.3V ± 0.1V
2	600kHz (603kHz) 400Hz 30% mod. 60dB/m	600kHz (603kHz)	AC voltmeter	RF on RF block	Maximum
3	1000kHz (999kHz) 400Hz 30% mod. 60dB/m	1000kHz (999kHz)	AC voltmeter	L152	Maximum



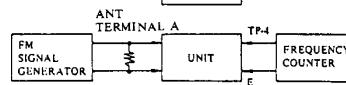
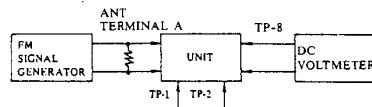
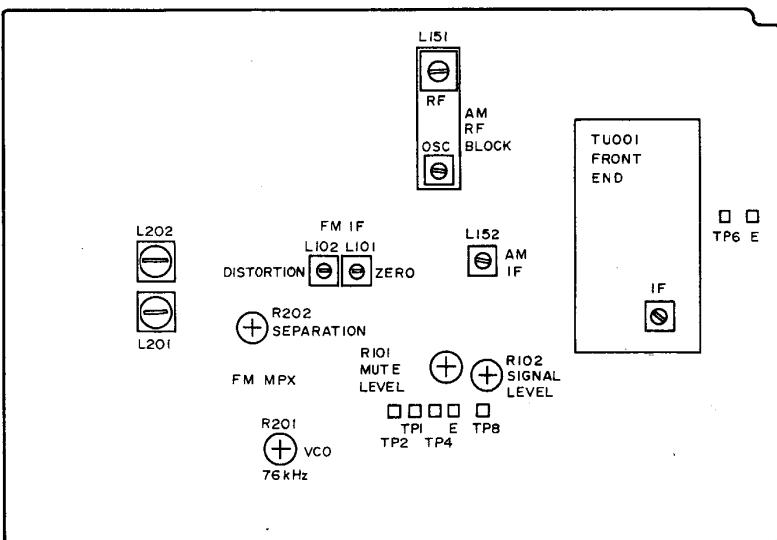
Reference specifications
FM Tuned voltage (TP-6) 87.5MHz 1.5±0.5V
108.0MHz 8.0±0.5V

Signal meter voltage (TP-8)
98MHz 60dB μ more than 4V

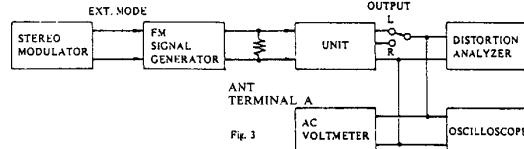
Auto stop level AM: Less than 62dB/m
FM: 14±3dB μ

Hi-blend switching level 33±5dB μ
NR switching level 17±5dB μ
DX/LOCAL switching level 60±8dB μ

AM Tuned voltage (TP-6) 530kHz 1.3±0.5V
1620kHz 8.0±0.5V



Use the high impedance probe. (10:1)



PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TUNER PC BOARD (NARF-3460-1/1A)

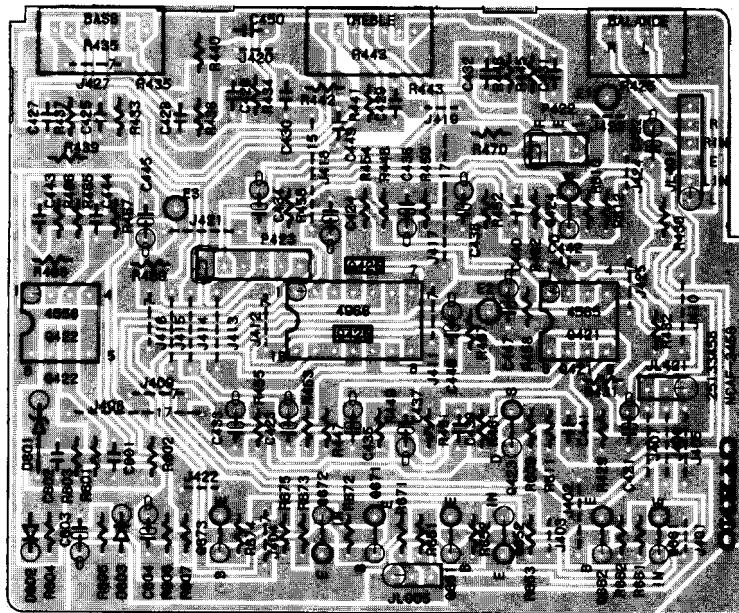
NOTE: <D>: Only 120V model
<W>: Only Worldwide model

PRINTED CIRCUIT BOARD-PARTS LIST

PRE. AND POWER AMPLIFIER PC BOARD (NAAF-3462-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION			
Transistors								
Q301-Q304	2211782 or 2211783	2SA991-F or 2SA991-E	Q903	222780122NEC	78M12			
Q491-Q494	2212285 or 2212286	2SC2878-A or 2SC2878-B	Q904	222780052NEC	78M05			
Diodes								
Q501, Q502	2211371 or 2211372	2SC2259-O-001 or 2SC2259-O-002	D301-D324	223163	1SS133			
Q503, Q506	2211455	2SA1015-GR	D491-D494	223163	1SS133			
Q507, Q508	2211732 or 2211733	2SC1845-F or 2SC1845-E	D501-D506	223163	1SS133			
Q509, Q510	2211255	2SC1815-GR	D507, D508	4000120	KB265			
Q511, Q512	2211353 or 2211354	2SA949-O or 2SA949-Y	D902, D903	224151602 or 224651602	05AZ16Y or HZ16EB2			
Q513, Q514	2211633 or 2211634	2SC2229-O or 2SC2229-Y	D904	223862 or 223890	WL01 or W01RL			
Q515, Q516	2211255	2SC1815-GR	D905	223880 or 223896	GP101N4003 or 1N4003F			
Q517, Q518	2211633 or 2211634	2SC2229-O or 2SC2229-Y	D906	223163	1SS133			
Q519, Q520	2211353 or 2211354	2SA949-O or 2SA949-Y	D907	224153301 or 224653301	05Z33X or HZ33EB1			
Q521, Q522	2201643 or 2201644	2SC3298-O or 2SC3298-Y	D952, D953	223163	1SS133			
Q523, Q524	2201633 or 2201634	2SA1306-O or 2SA1306-Y	D961	224151001 or 224651001	05AZ10X or HZ10EB1			
Q525, Q526	2201653,	2SC3856-O, #	D971-D973	223163	1SS133			
Q529, Q530	2201654 or 2201655	2SC3856-Y or 2SC3856-P	Capacitors					
Q527, Q528	2201663,	2SA1492-O, #	C301, C302	354741009	10 μ F, 16V, Elect.			
Q531, Q532	2201664 or 2201665	2SA1492-Y or 2SA1492-P	C307, C308	371128224	8200pF \pm 5%, 50V, Mylar			
<p>NOTE: Replacement for transistor of mark #, if necessary, must be made from the same beta group (HFE) as the original type.</p> <p>Ex. 2SC3856-O 2SA1492-O</p>								
Q571, Q572	2211633 or 2211634	2SC2229-O or 2SC2229-Y	C309, C310	371123034	0.03 μ F \pm 5%, 50V, Mylar			
Q573, Q574	2211732 or 2211733	2SC1845-F or 2SC1845-E	C313, C314	371121134	0.011 μ F \pm 5%, 50V, Mylar			
Q575	2211792 or 2211793	2SA992-F or 2SA992-E	C315, C316	354721029	1000 μ F, 6.3V, Elect.			
Q691, Q692	2212600	DTA124ES	C317, C318	354741009	10 μ F, 16V, Elect.			
Q905	2201934, 2201935 or 2201936	2SB1186-D, 2SB1186-E or 2SB1186-F	C319, C320	354742219	220 μ F, 16V, Elect.			
Q906, Q907	2211945	2SK246-GR	C321-C336	354741009	10 μ F, 16V, Elect.			
Q951, Q952	2211255 or 2210746	2SC1815-GR or 2SC945A-P	C337-C340	354780229	2.2 μ F, 50V, Elect.			
Q953	2211643 or 2211644	2SA965-O or 2SA965-Y	C341-C348	354741009	10 μ F, 16V, Elect.			
Q954	2211792 or 2211793	2SA992-F or 2SA992-E	C399	354741009	10 μ F, 16V, Elect.			
Q961, Q962	2211255 or 2210746	2SC1815-GR or 2SC945A-P	C401, C402	354780229	2.2 μ F, 50V, Elect.			
Q971-Q973	2211255	2SC1815-GR	C405, C406	354721019	100 μ F, 6.3V, Elect.			
Resistors								
Q305-Q311	222502	NJM4558DX	R525, R526	442522704	27ohm, 1/2W, Metal oxide film			
Q312, Q313	22240079	LC7821	R529, R530	442529104	91ohm, 1/2W, Metal oxide film			
Q314	22240081	LC7822	R531, R532	5210062	N06HR4, 7KBD, Semi-fixed, Idling			
Q401	22240191	NJM4565DD	R537, R538	442521024	1kohm, 1/2W, Metal oxide film			
			R539, R540	442521014	100ohm, 1/2W, Metal oxide film			
			R541-R548	442520224	2.2ohm, 1/2W, Metal oxide film			
			R549-R552	441620104	1ohm, 1W, Metal oxide film			
			R553-R560	4000063 or 4500009	0.47ohm, 2W, Metal plate			
			R561, R562	441520474	4.7ohm, 1/2W, Metal oxide film			
			R563, R564	441720824	8.2ohm, 2W, Metal oxide film			

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
R567-R570	442521014	100ohm, 1/2W, Metal oxide film	P302, P303	25045213	NPJ-6PDBL-92
R591, R592	442520224	2.2ohm, 1/2W, Metal oxide film	P304	25045171	NPJ-4PDBL-65
R902-R905	441621814	180ohm, 1W, Metal oxide film	P501	25060125	NTM-8PDMN058
R910	442524794	0.47ohm, 1/2W, Metal oxide film		Plugs	
R913	441620474	4.7ohm, 1W, Metal oxide film	P401a, P402a	25055133	NPLG-3P117
R914	441721804	18ohm, 2W, Metal oxide film	P422a	25055133	NPLG-3P117
R916	442529104	91ohm, 1/2W, Metal oxide film		Sockets	
	Coils		P421	2000931	NSAS-6P884
L501, L502	231134	S-0.8E	JL421	25050267	NSCT-3P95
	Switches		JL702	25050273	NSCT-9P101
S301	25065358	NSS-42136, Cartridge selector	JL703	25050268	NSCT-4P96
S302	25065286	NSS-22112, Mode VCR	JL901	25050270	NSCT-6P98
	Relays			Shield plate	
RL501	25065342	NRL-2P1. 25A-DC24-048, Headphone		27150267	
RL502, RL503	25065360	NRL-2P7A-DC24V-052, Speaker		Bracket	
	Terminals			27141059	GND
P301	25045252	NPJ-6PDBL-124		Radiators	
				27160146	RAD-52

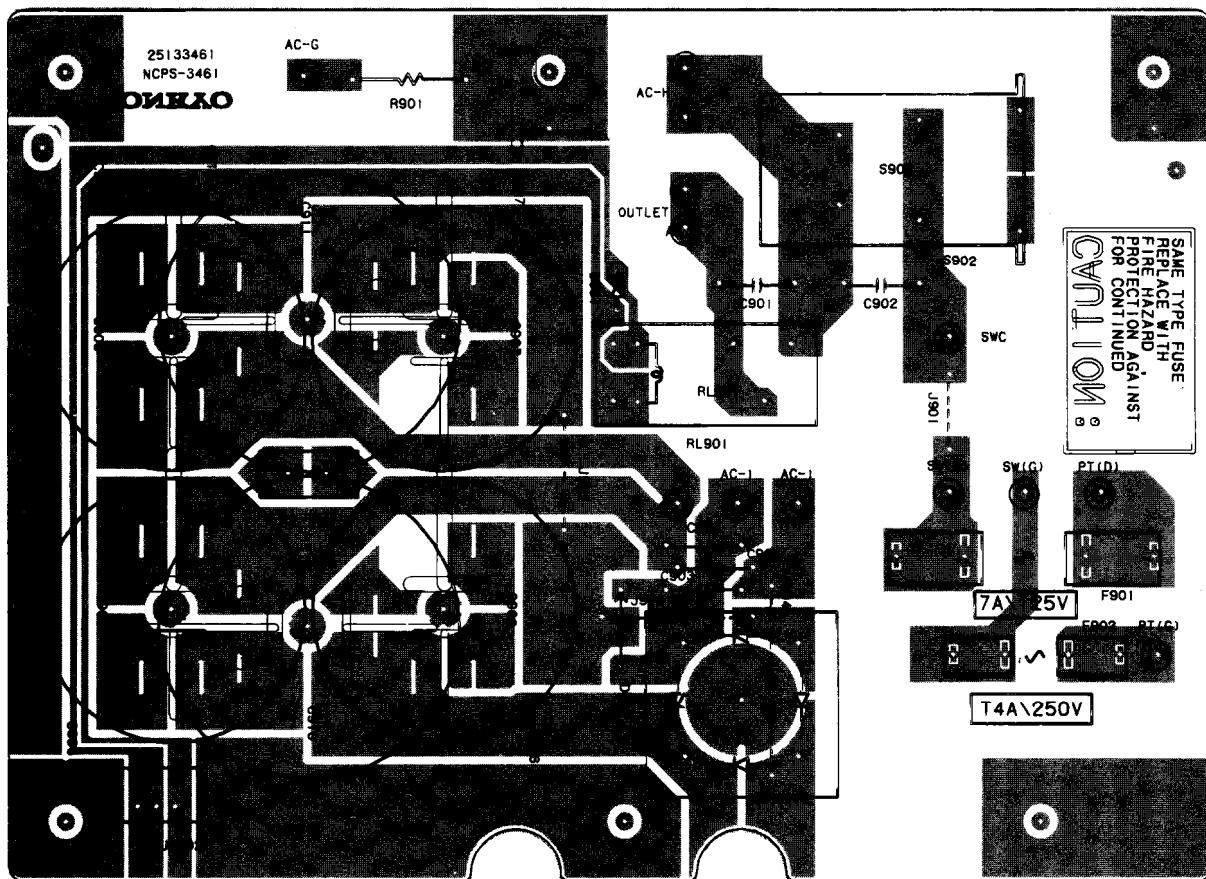


TONE CONTROL CIRCUIT PC BOARD

TONE CONTROL CIRCUIT PC BOARD (NAAF-3458-1)

CIRCUIT NO.	PART NO.	DESCRIPTION	CIRCUIT NO.	PART NO.	DESCRIPTION
	ICs		C429, C430	371124724	4700pF±5%, 50V, Mylar
Q421	22240191	NJM4565DD	C431, C432	371123934	0.039μF±5%, 50V, Mylar
Q422	222502	NJM4558DX	C433, C434	354780229	2.2μF, 50V, Elect.
Q425	22240025	LC4966	C435-C438	354781099	0.1μF, 50V, Elect.
	Transistors		C439-C442	371121024	1000pF±5%, 50V, Mylar
Q423, Q424	2211945	2SK246-GR	C443	371121124	1100pF±5%, 50V, Mylar
Q651, Q662	2211255 or	2SC1815-GR or	C444	371121234	0.01μF±5%, 50V, Mylar
Q671, Q673	2210746	2SC945A-P	C445	354741009	10μF, 16V, Elect.
Q652, Q661	2212600	DTA124ES	C446, C447	354744709	47μF, 16V, Elect.
Q672			C603	354781099	0.1μF, 50V, Elect.
	Diodes		C604	354780229	2.2μF, 50V, Elect.
D601	224150623, 224650623 or 224450623	05AZ6. 2Z, HZ6. 2EB3 or MTZ6. 2C	R425	5104225	N11RGLC250KWT22Z, Variable, Balance
D602, D603	223163	1SS133	R435, R436	5104216	N14RLC50KC22Z, Variable, Bass
	Capacitors		R443, R444	5104216	N14RLC50KC22Z, Variable, Treble
C421, C422	354780229	2.2μF, 50V, Elect.		Sockets	
C423, C424	354741009	10μF, 16V, Elect.	P422	2000931	NSAS-6P884
C425, C426	371123334	0.033μF±5%, 50V, Mylar	P423	2000933	NSAS-12P885
C427, C428	352983396	0.33μF, 50V, Non-polar elect.			

PRINTED CIRCUIT BOARD VIEW FROM BOTTOM SIDE



POWER SUPPLY CIRCUIT PC BOARD

PRINTED CIRCUIT BOARD-PARTS LIST

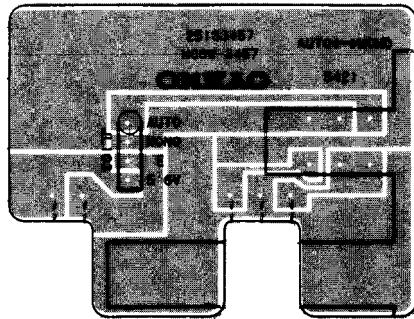
POWER SUPPLY CIRCUIT (NAPS-3461-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Diodes		
D901	223898	RB602
D951	223163	1SS133
Capacitors		
C901, C902	3500065A	DE7150FZ103PAC400V/125V, Capacitor IS
C903-C905	335251039	0.01 μ F, 500V, Ceramic
C906-C909	3504228	12000 μ F, 71V, Elect.
Resistor		
R901	431523355	3.3Mohm, 1/2W, Solid <D>
Relay		
RL901	25065357	NRL-1P5A-DC24V-051 <D>
	25065341	NRL-1P15A-DC24V-047 <W>
Switch		
S902	25035603	NPS-121-L564P
Fuseholders		
F901a	250113	SN5051
F902a	25050065	YSH403T <W>
Fuses		
F901	252052	7A (ST-6)
F902	252077	4A-SE-EAK <W>

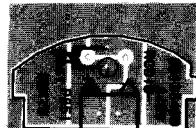
CIRCUIT NO.	PART NO.	DESCRIPTION
JL902	25050267	NSCT-3P95
	27141059	GND
	27160196	RAD-64
Busses		
	27300826A	Two pieces
	27300827A	

NOTE: <D>: Only 120V model
 <W>: Only Worldwide model

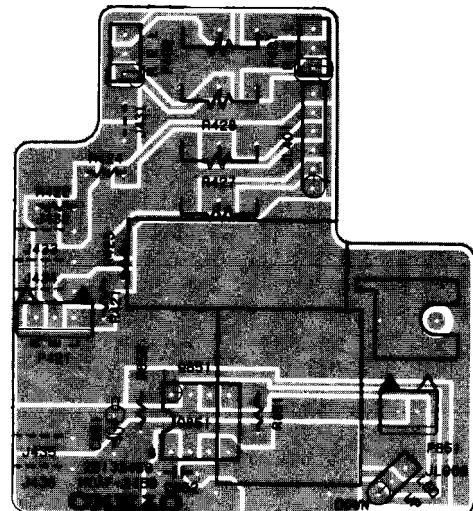
NOTE: THE COMPONENTS IDENTIFIED BY MARK \triangle ARE CRITICAL FOR RISK OF FIRE AND ELECTRIC SHOCK. REPLACE ONLY WITH PART NUMBERS SPECIFIED.



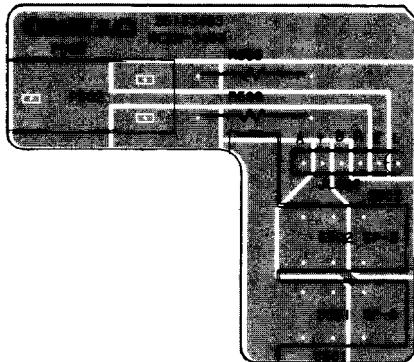
MODE SWITCH PC BOARD



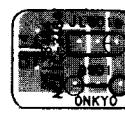
VOLUME INDICATOR PC BOARD



VOLUME PC BOARD



SPEAKER SWITCH PC BOARD



POWER SUPPLY TRANSISTOR PC BOARDS

MODE SWITCH PC BOARD (NASW-3457-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
S421, S301a	25035599	NPS-100-122-L561, Mode/Cartridge selector switch

VOLUME INDICATOR PC BOARD (NADIS-3459-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
D851	225241 or 225242	SEL2210R-C or SEL2210R-D, LED
	27190545	Holder

SPEAKER SWITCH PC BOARD (NASW-3463-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
R565, R566	441623914	390ohm, 1W, Metal oxide film
S501, S502	25035517	NPS-222-L479, Speaker switch
P502	25045187	HLJ-0541-01-010, Headphone terminal

VOLUME PC BOARD (NAAF-3456-1)

CIRCUIT NO.	PART NO.	DESCRIPTION
Q851	222963	LB1630, IC
C851	354721019	100 μ F, 6.3V, Elect. capacitor
R401, R402	5144008	N16RGL50KA30F, Variable resistor
R427, R428		

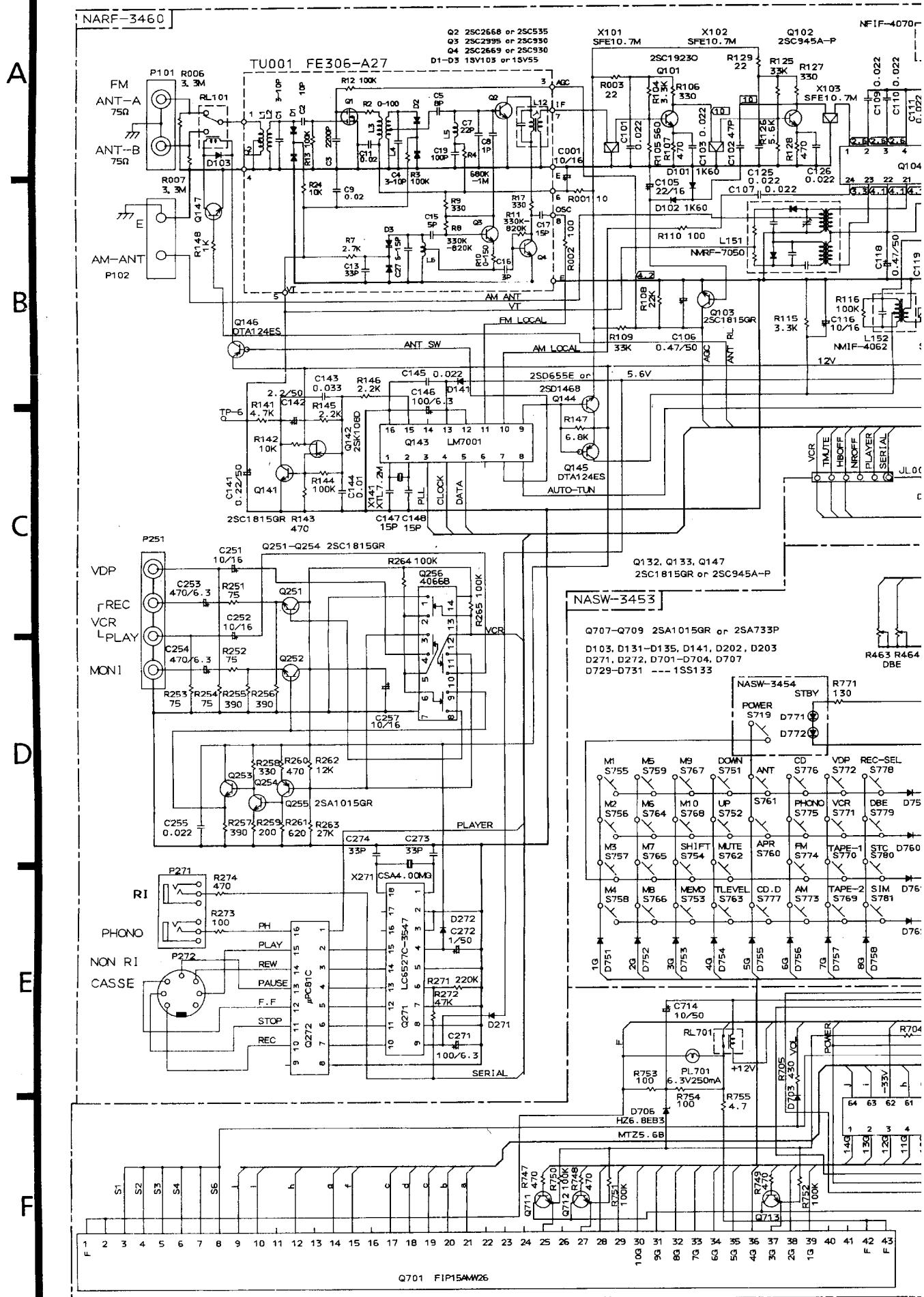
CIRCUIT NO.	PART NO.	DESCRIPTION
P401	2000931	NSAS-6P884, Socket
P402	2000624	NSAS-6P580, Socket
P851	2000635A	NSAS-4P591, Socket
P421a	25055133	NPLG-3P117, Plug
	27141059	Bracket GND

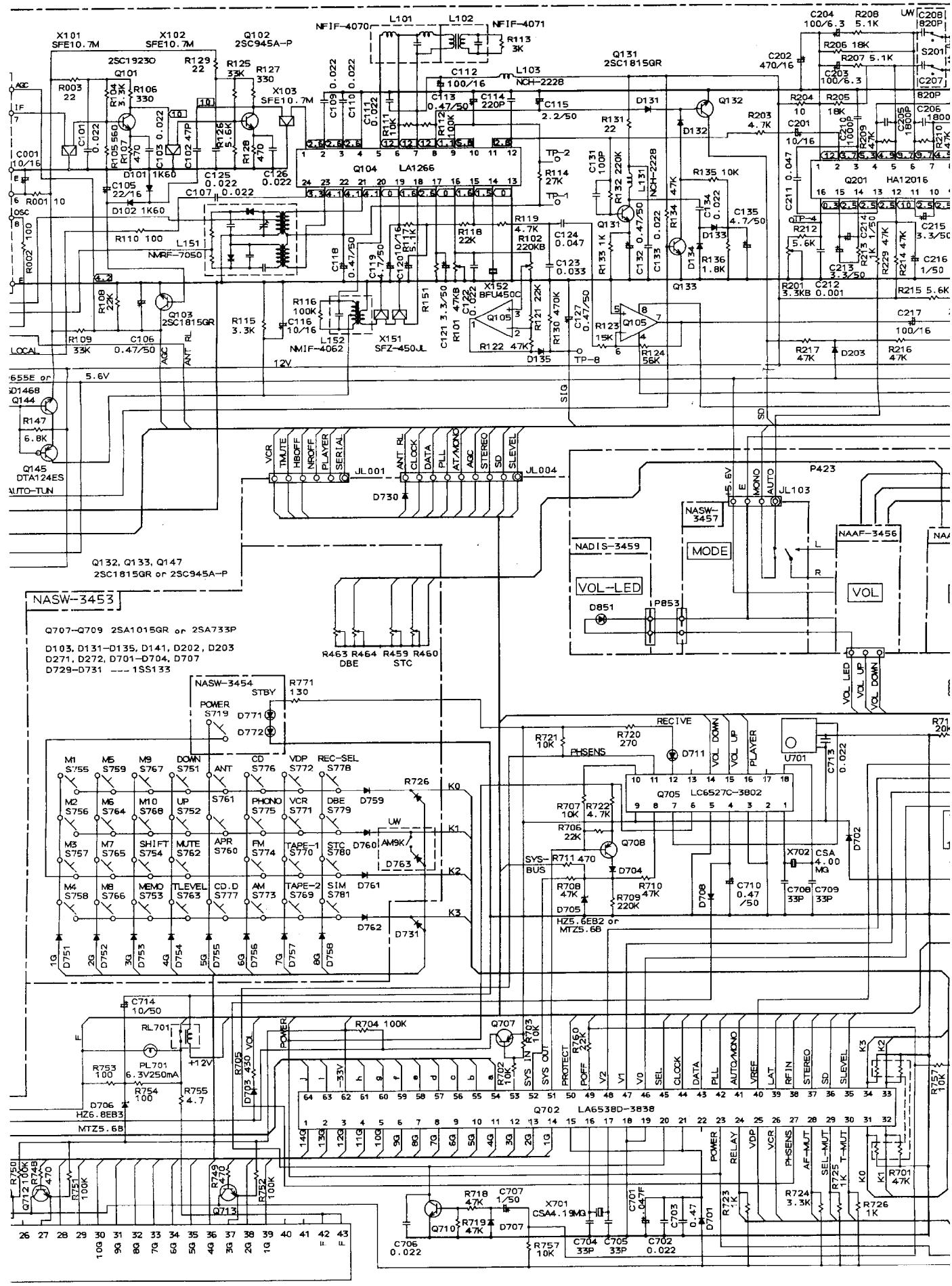
POWER SUPPLY TRANSISTOR PC BOARD (NAETC-3464-1)

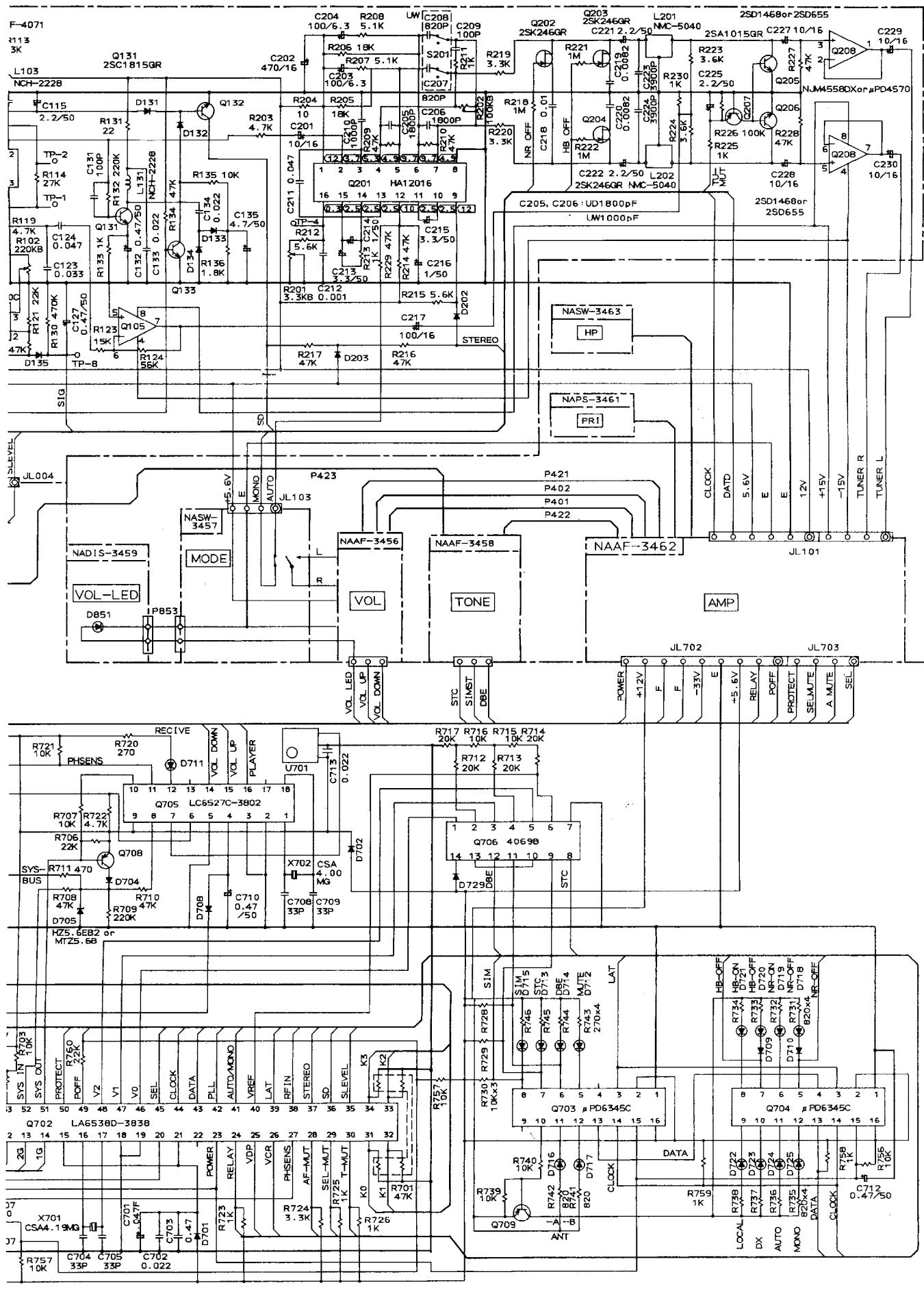
CIRCUIT NO.	PART NO.	DESCRIPTION
Q901	2201944, 2201945 or 2201946	2SD1763-D, 2SD1763-E or 2SD1763-F, Transistor

POWER SUPPLY TRANSISTOR PC BOARD (NAETC-3465-1)

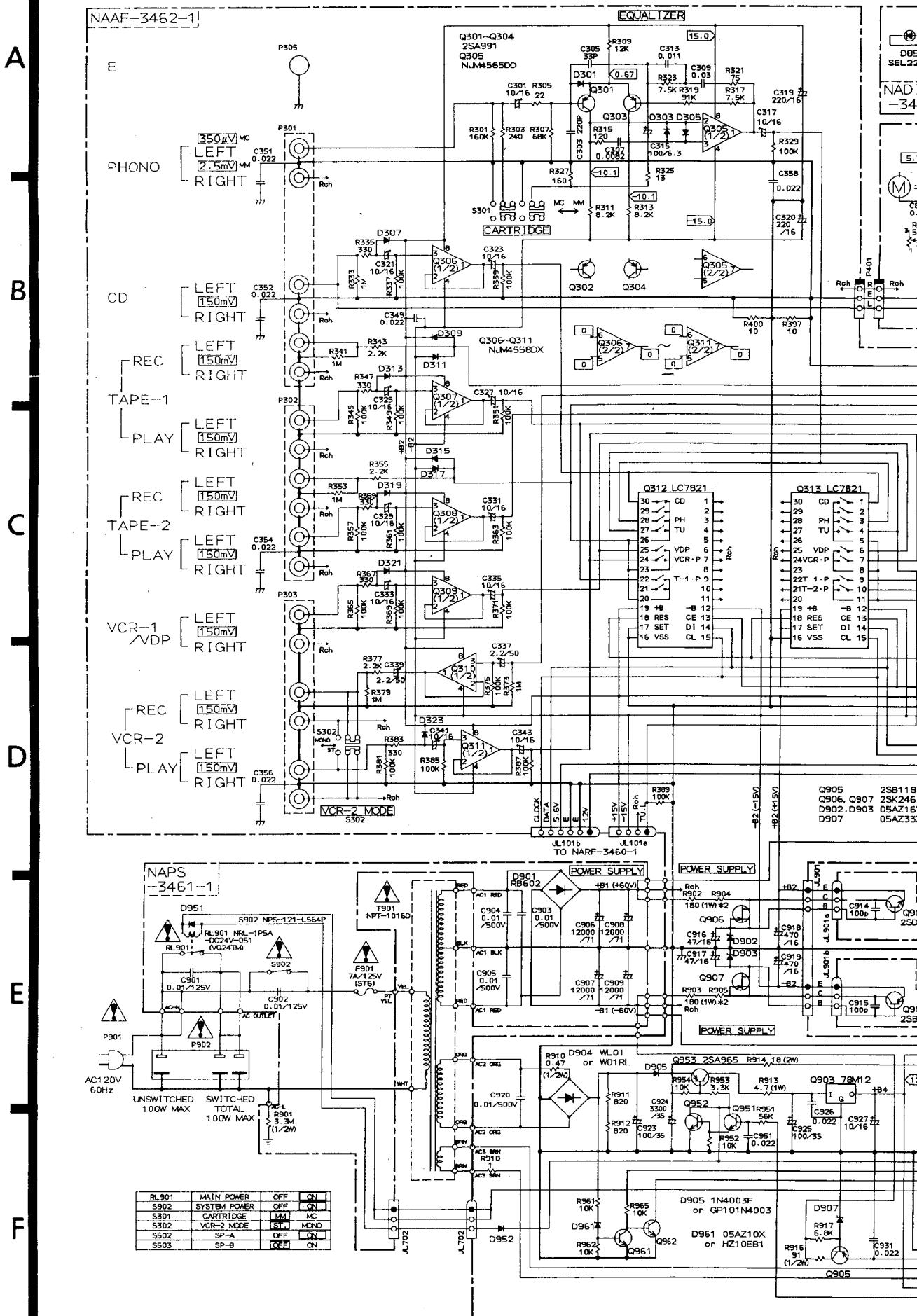
CIRCUIT NO.	PART NO.	DESCRIPTION
Q902	2201934, 2201935 or 2201936	2SB1186-D, 2SB1186-E or 2SB1186-F, Transistor

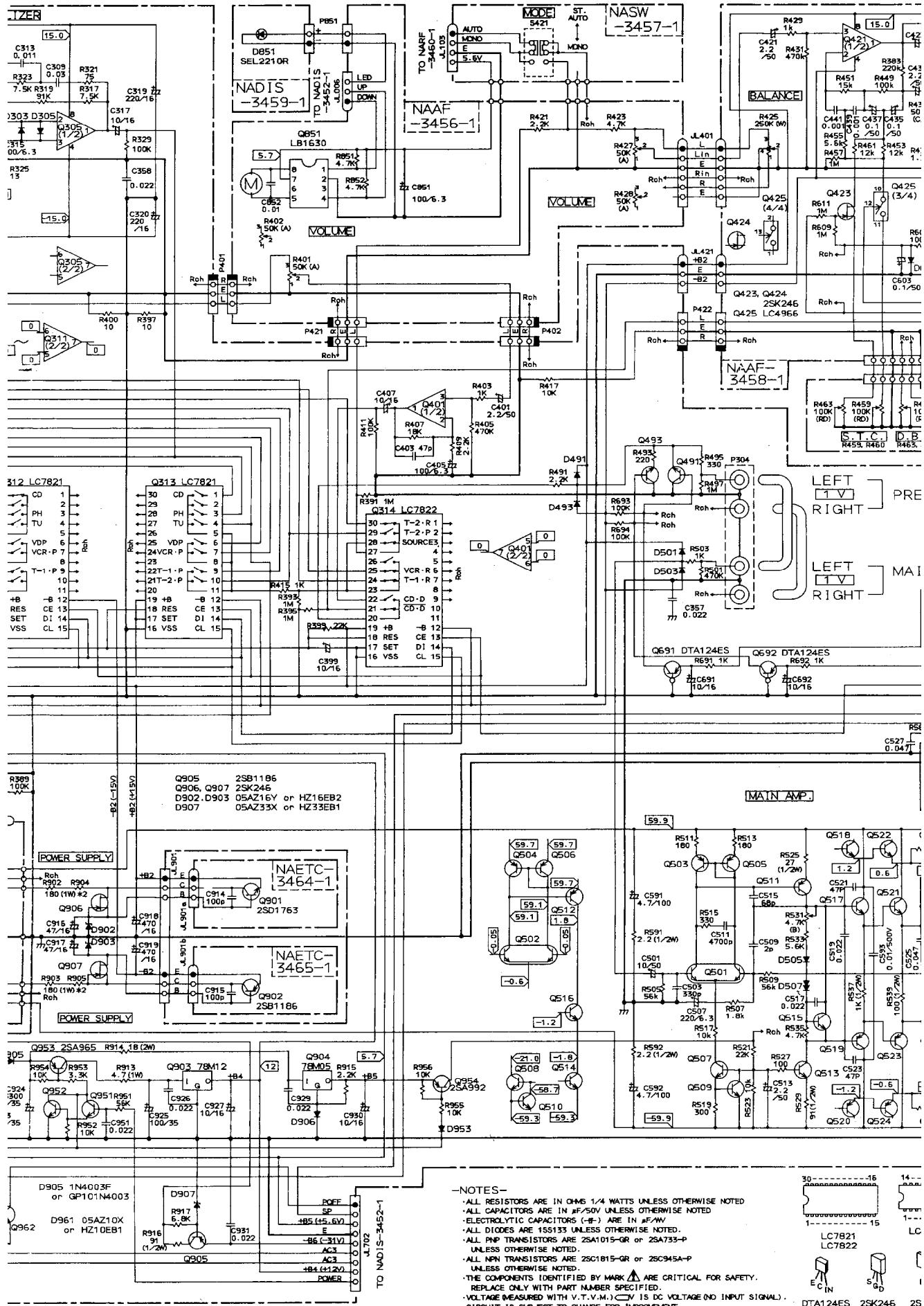


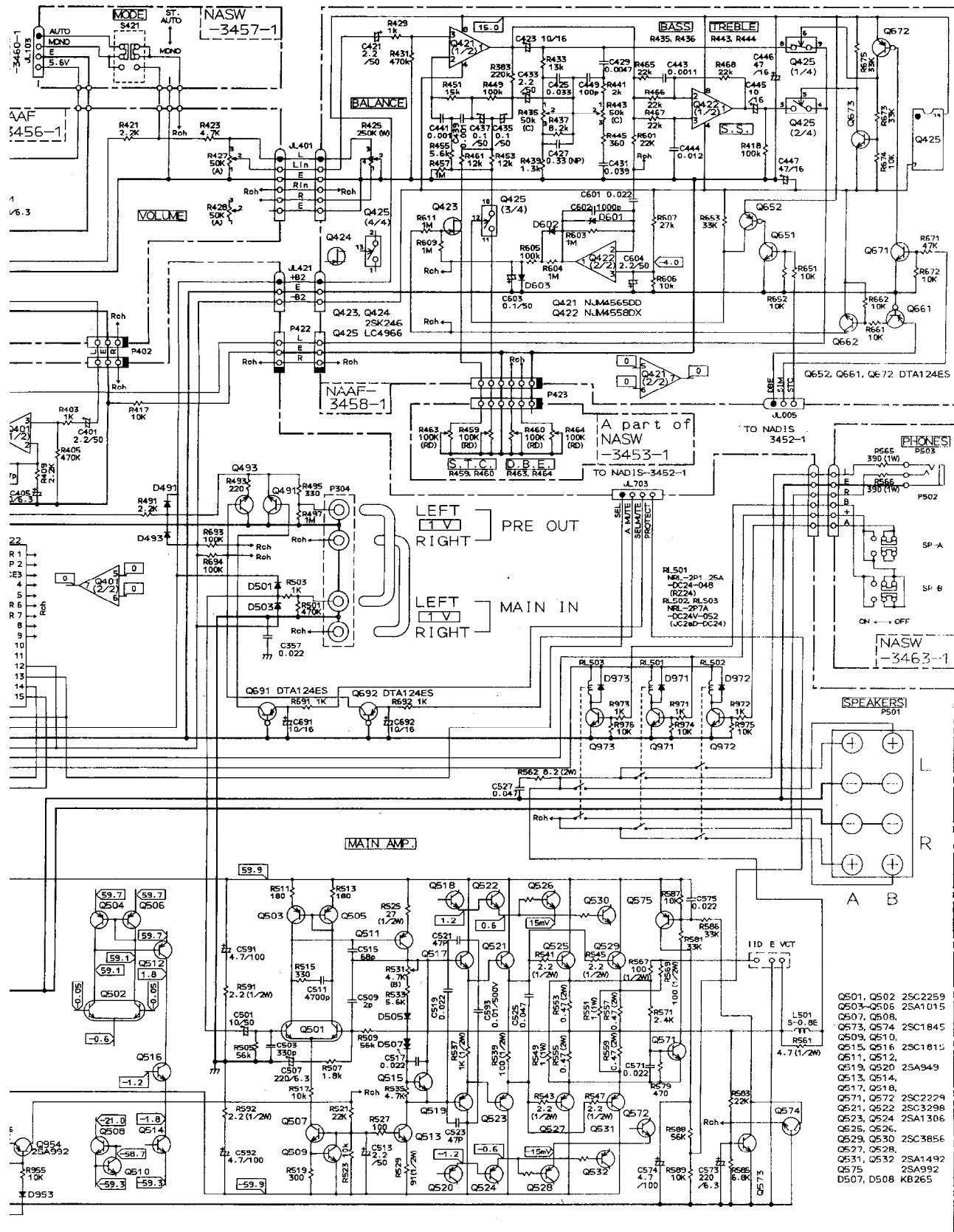




SCHEMATIC DIAGRAM

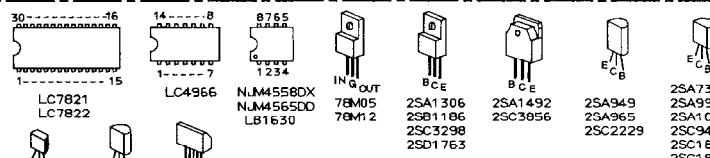






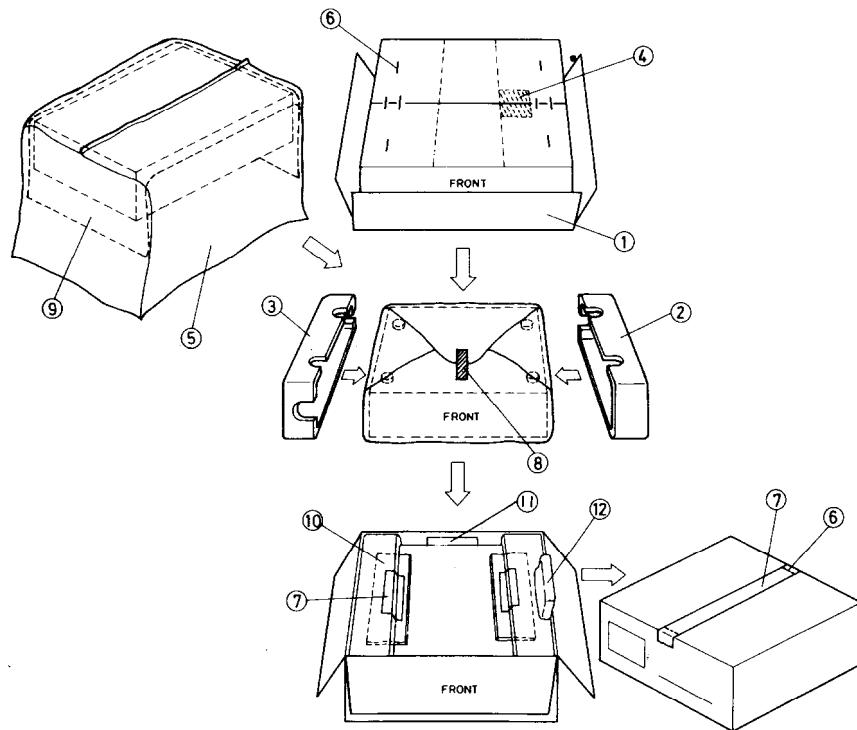
-NOTES-

- ALL RESISTORS ARE IN OHMS 1/4 WATTS UNLESS OTHERWISE NOTED
- ALL CAPACITORS ARE IN μ F/50V UNLESS OTHERWISE NOTED
- ELECTROLYTIC CAPACITORS (+/-) ARE IN μ F/50V
- ALL DIODES ARE 1SS133 UNLESS OTHERWISE NOTED.
- ALL PNP TRANSISTORS ARE 2SA1015-GR or 2SA733-P UNLESS OTHERWISE NOTED.
- ALL NPN TRANSISTORS ARE 2SC9185-GR or 2SC945A-P UNLESS OTHERWISE NOTED.
- THE COMPONENTS IDENTIFIED BY MARK \triangle ARE CRITICAL FOR SAFETY. REPLACE ONLY WITH PART NUMBER SPECIFIED.
- VOLTAGE MEASURED WITH V.T.M.-C/CV = DC VOLTAGE (NO INPUT CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT).



ONKYO CORPORATION

PACKING VIEW



REF NO.	PART NO.	DESCRIPTION
1	29051816A 29051817A	Master carton box (TX-890) Master carton box (TX-890M/PX)
2	29091299B	Pad L
3	29091300B	Pad R
4	29091317	Pad B
5	29100035A	1020×720mm, Poly-vinyl bag
6	282301	Sealing hook
7	260012	Damplon tape
8	261504	Adhesive tape
9	29095395	880×500mm, Protection sheet
10	29095498	Sheet P
11	29341341A 29341340	Accessory bag ass'y Instruction manual
	292064B	Instruction manual for RC-AV20M (TX-890M/PX)
	232140	FM antenna
	2010169	NMA-3057, AM loop antenna
	24140021	Connection cord for RI
	3010054	RC-118S, Remote controller (TX-890)
	25060123	UM-3, Two batteries (TX-890)
	25055251	Two adaptors for FM antenna
	28330072	CV-CP, Conversion plug (PX)
	29365019	Three cpas for AC outlet (PX)
	29365021	Warranty card (UDN)
	29358002F	Warranty card (PX)
	29100097	Service station list
12	24140035	250×350mm, Poly-vinyl bag
		RC-AV20M, Remote controller (TX-890M/PX)

NOTE: (UDN): Only U.S.A. model
(PX): Only PX model